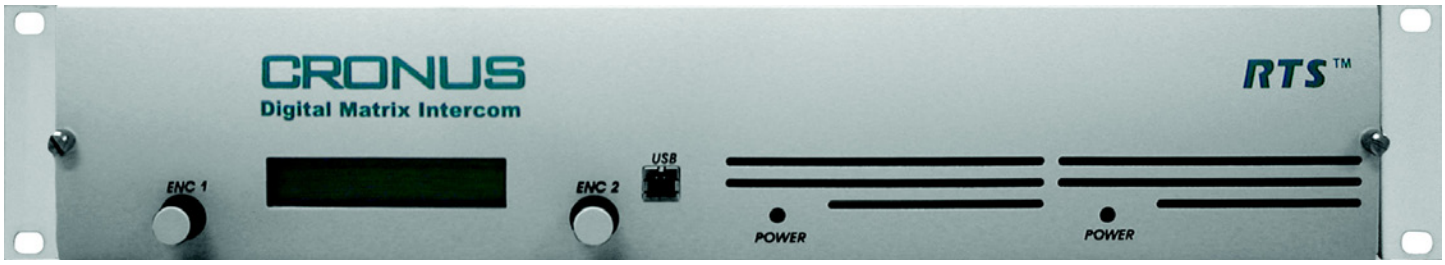
Cronus
Digital Intercom Matrix



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Warranty Notice

See the enclosed warranty card for further details.

Customer Support

Technical questions should be directed to:

Customer Service Department
RTS/Telex Communications, Inc.
12000 Portland Avenue South
Burnsville, MN 55337 USA
Telephone: 800-392-3497
Fax: 800-323-0498
Factory Service: 800-553-5992

Return Shipping Instructions

Customer Service Department
Telex Communications, Inc. (Lincoln, NE)
Telephone: 402-467-5321
Fax: 402-467-3279
Factory Service: 800-553-5992

Please include a note in the box which supplies the company name, address, phone number, a person to contact regarding the repair, the type and quantity of equipment, a description of the problem and the serial number(s).

Shipping to the Manufacturer

All shipments of product should be made via UPS Ground, prepaid (you may request from Factory Service a different shipment method). Any shipment upgrades will be paid by the customer. The equipment should be shipped in the original packing carton. If the original carton is not available, use any suitable container that is rigid and of adequate size. If a substitute container is used, the equipment should be wrapped in paper and surrounded with at least four (4) inches of excelsior or similar shock-absorbing material. All shipments must be sent to the following address and must include the Proof of Purchase for warranty repair. Upon completion of any repair the equipment will be returned via United Parcel Service or specified shipper, collect.

Factory Service Department
Telex Communications, Inc.
8601 East Cornhusker Hwy.
Lincoln, NE 68507 U.S.A.
Attn: Service

This package should include the following:

Item	Description
38110-387	Warranty Statement
9010-44400-001 or 9010-7770-000	Cronus Final Assembly, Fiber Linking Cronus Final Assembly, Coax Linking
9020-7800-000	Cronus AI/O Rear Card, MDR SCSI
9020-7787-001	Cronus AI/O Rear Card, RJ12
690505	Cable Assy., CAT5, 7ft., black, RJ45 Plugs
600091	USB Cable, 6ft. 10 in. long
9015-7532-000	AZedit Software
9020-7297-05	RS232C
590446-000	PC Cable
576196-000	Coax Assy. Cronus
9015-7785-001	Cronus Intelligent Linking License
9002-7770-001	Cronus Rear Cover Plate
9030-7784-001	Cronus AI/O Front Card
8800102668	Power Cord
9350-7770-000	User Manual
9030-7835-000	RVON-C Front Card (if applicable)
9020-7835-100	RVON-C Back Card (if applicable)

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CHAPTER 1

Introduction

General Description

RTS® Cronus is a 32-port digital matrix intercom in 2RU (rack units). Based upon an advanced DSP architecture, Cronus has the ability to link up to four units into a single 128 port matrix. Through the use of standard video coaxial cable, the maximum distance between the first and last Cronus system can be 300 ft., and still appear as a single matrix. However, when using the Fiber Option card, the distance is increased up to 15 kilometers nominally. When connected as a single matrix, the individual Cronus controls remains autonomous and independent at each matrix for the highest reliability.

Features

USB Connectivity	Convenient front panel access, as well as traditional rear access for system programming. Note, you may use either the front panel access or the rear panel access at a time. **NOTE:** The USB drivers for Cronus are installed with the AZedit software. You can find the folder at *C:\Telex\AZedit\V20606*. The drivers are bundled in version 2.06.06 or later.
Advanced DSP	Digital signal processing designed to support audio signal processing on all 32 ports (inputs).
Modular Architecture	The modular architecture allows for port expansion from 8 to 32 ports giving each user expandable systems in the field.
Redundant Power Supply	Each chassis is powered by two power supplies, either of which can sufficiently power all the equipment ALONE. This provides constant power and disaster recovery even with the failure of one power supply.

Differences between Cronus and ADAM

Cronus	**ADAM**
Most practical for small to medium systems.	Most practical for more complex systems because the number of users is much higher.
In small to medium-sized broadcast company, Cronus would be used like an ADAM.	Uses ASIC technology
Cronus is scalable - can keep adding on to the original configuration (up to four systems maximum)	ADAM has both a redundant power supply and a redundant Master Controller card.
Cronus has a redundant power supply.	
Has one USB port with front and rear access.	
Has capability for Ethernet connection	
Cronus has individual data drives, meaning the address does not need to be set at the keypanel.	

Front and Rear Panel Controls and Connections

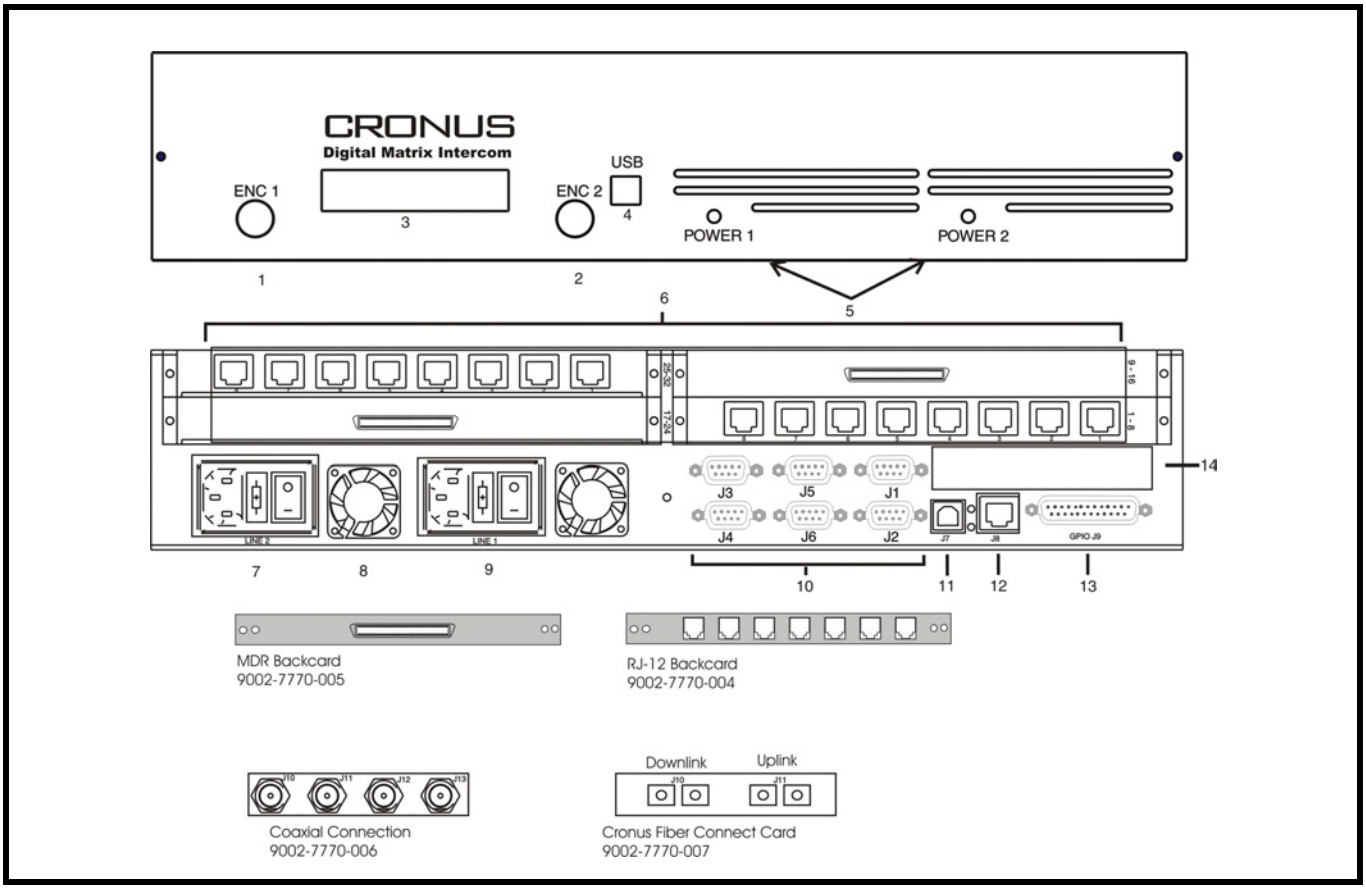


FIGURE 31. Controls, Connections, and Cronus backcard. There are two Cronus backcards, an MDR backcard and an RJ-12 backcard. You can have up to four backcards installed on Cronus. You can have any combination of backcards on the Cronus, too (for example, you can have two RJ-12 backcards and two MDR backcards.

NOTE: For more information on a VOIP option card (RVON-C) for the Cronus, See "RVON-C RTS Voice Over Network for Cronus" on page 37.

1	ENC 1	This knob allows you to select a menu item, scroll through menus or exit out of the display menu.
2	ENC 2	This knob allows you to select a menu item, scroll through menus or exit out of the display menu.

NOTE: Only when you are in the crosspoint status menu do the left and right knob perform separate functions. The Right knob adjusts the output port, while the Left knob adjusts the input port.

3	Display Panel	LCD display showing menu options.
4	USB Connection	There are two USBUSB connections on the Cronus; one on the front panel and one on the back panel (J7). Cronus system can use the USB port connect with a PC. This allows for the most flexibility when planning where to use the system. In a rack unit where the back is inaccessible, or on a desktop where the back is accessible. Note, only one USB connector can be used at a time.
5	Power 1 & Power 2	The power source indicator is a green LED light displaying that power is ON. The Cronus has a redundant power source. This means there are two power supplies, so if power supply 1 fails, power supply 2 will take over powering the system.
6	Keypanel Ports (backcard)	One Cronus frame can have 32 ports through the use of either an RJ-12 backcard or an MDR backcard. In all, the Cronus system supports a maximum of 128 ports available for keypanels. You can also mix and match the backcards (for example, you can have 2 MDR backcards with 2 RJ-12 backcards on the same frame). The MDR backcard is primarily used to connect the three compatible breakout panels, XCP-32-DB9, XCP-48-RJ45 and the XCP-48-Telco (See “Breakout Panels” on page 83).

NOTE: Using an MDR backcard (9002-7770-005), you can utilize a DB-9 breakout panel (XCP-32-DB9 9000-7515-000). One DB-9 breakout panel can support all four AIO cards within Cronus.

7 & 9	LINE 1 and LINE 2	Cronus has two power sources; a primary source (LINE 1) and a redundant power source (LINE 2). Both power sources are running at the same time, so that if the primary source fails the redundant source will be able to power Cronus.
8	Fans	There are two fans to cool the power supplies
10, 11 & 12	DB-9 Serial Connections, USB Connector and RJ-45 Connectors	There are three ways to connect to a PC from the Cronus, through a DB-9 serial connection (10), USB connector (11), or an RJ-45 (Ethernet) connection (12). There are six DB-9 serial ports, however only five of the serial ports are used (J1, J2 [reserved], J3, J4, and J5) and one is undefined (J6). **NOTE**: J1 will always be connected to AZedit. For more information on AZedit baud rates, see “DIP Switch Settings” on page 10.
13	DB-25 Connection	General Purpose Input Output connection. **NOTE**: The pin-out of this connection is not the same as Zeus, ADAM, or ADAM CS.
14	Coaxial and Fiber Connection	There are four coaxial or two fiber connections used to connect the frames together. See, figure 4B for the configuration illustration. Requires optional licensing firmware. Contact Telex Customer Service for more information. When contacting Customer Service be sure to have the MAC address for each unit. For information on how to obtain the MAC address, see “Finding the MAC Address for Cronus” on page 30.

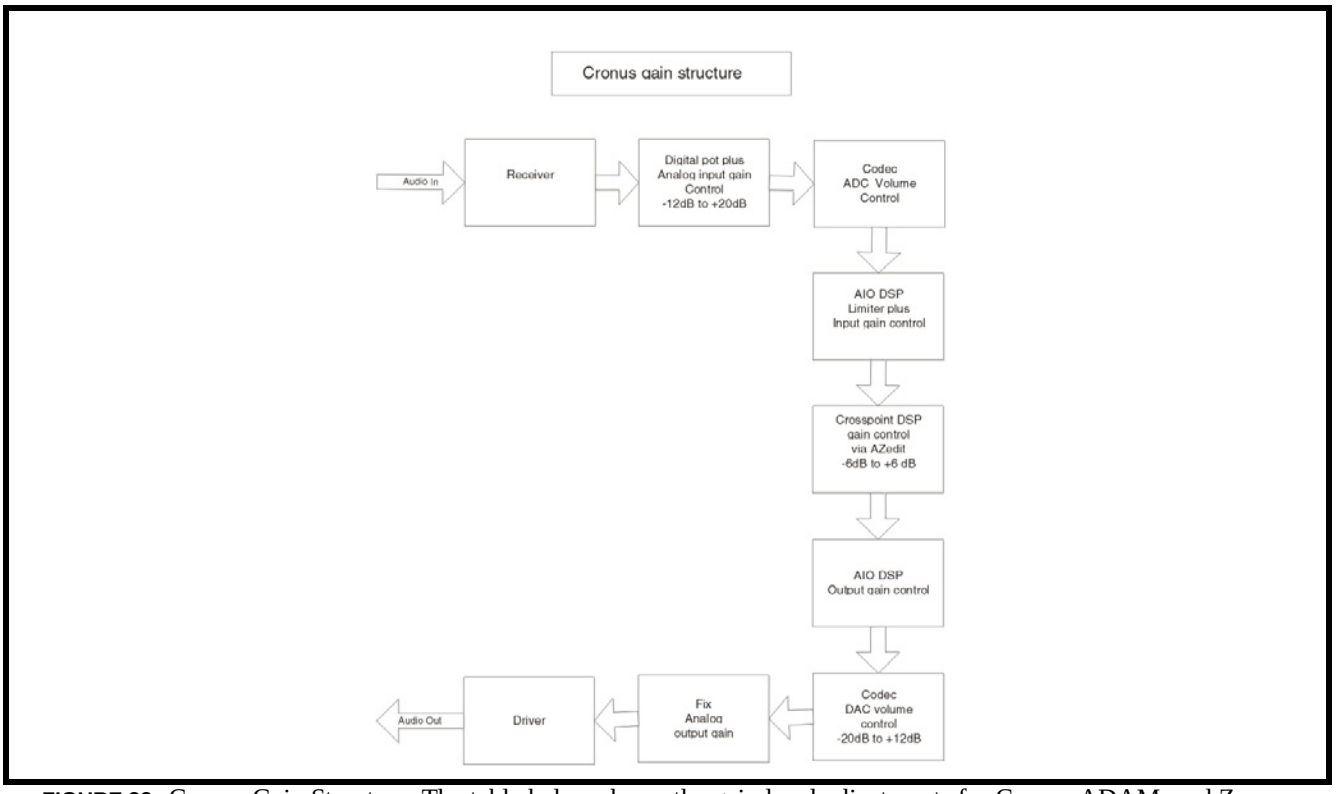


FIGURE 32. Cronus Gain Structure. The table below shows the gain level adjustments for Cronus ADAM, and Zeus.

	MAX Audio Input Level	Input Gain Control Range via AZedit	Output Gain Control Range via AZedit	Max Input Gain	Cross Point Gain	Max Audio Output Level
Cronus V0.2.x	+10dBu	-20dB to +20dB	20dB to 12d	Nominal +10dB	-6dB to +6dB	+21dBu
V1.0.0	+20dB	-20dB to +20dB	-20dB to +20dB	Nominal +20dB	-6dB to +6dB	+24dBu
ADAM	+20dB	-20dB to +20dB	-20 to 20dB	Nominal +20dB	-6dB to +6dB	+28dBu
Zeus	+20dB	-20dB to +20dB	-20 to 13dB	Nominal +20dB	-6dB to +6dB	+22dBu

FIGURE 33. RJ-12 backcard (9002-7770-006)

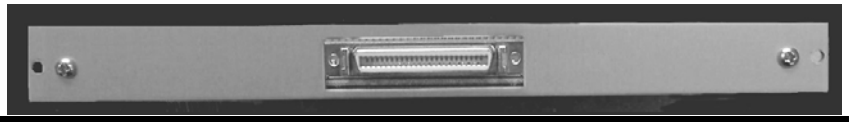


FIGURE 34. MDR backcard (9002-7770-005)

Specifications

Analog Inputs and Outputs

Signal Type ..... balanced
Nominal Level 8dBu
Maximum Level..... 20dBu
Input Impedance ..... 22k Ohm
Output Impedance.....600 Ohm SNR at 20 dBu:

A/D and D/A

Sampling Rate..... 48 kHz
Resolution..... 24 bits

Performance

SNR at 20 dBu: (A-weighted) ..... >90dB
THD+N at 20dBu, 1 kHz (unweighted) .....<0.007%
Frequency Response at 20 dBu..... within ±1dB from 50 Hz - 20kHz
Crosstalk at 20dBu..... <-60 dBu
CMRR..... >70 dB

NOTE: All measurements performed using an Audio Precision System 1 Dual Domain System at f=1kHz and Level = 20dBu. Measurement bandwidth = 20Hz to 20kHz.

Connections

Intercom Channels (1-32)
Connector Type: 6-pin RJ-12
Pin 1 ..... Control -
Pin 2 .....Audio Out +
Pin 3 ..... Audio In +
Pin 4 ..... Audio In -
Pin 5 .....Audio Out-
Pin 6 ..... Control +

Serial Interface Port (J1 - J6)
Connector Type: 9-pin female D-sub
J1: RS-232 (AZedit)
Pin 1 ..... Not Used
Pin 2 .....Input RS-232
Pin 3 .....Output RS-232
Pin 4 ..... Not Used
Pin 5 .....GND
Pin 6 .....GND
Pin 7 ..... Not Used
Pin 8 ..... Not Used
Pin 9 ..... Not Used

J2: RS-232 (Debug)
Pin 1 .....Not Used
Pin 2 ..... GND
Pin 3 ..... Input RS-232
Pin 4 .....Not Used
Pin 5 .....Not Used
Pin 6 .....Not Used
Pin 7 ..... GND
Pin 8 ..... Output RS-232
Pin 9 .....Not Used

J3: RS-232/RS-485 (J3 is trunking)
Pin 1 .....RS-422-/RS-485-
Pin 2 ..... GND
Pin 3 .....Not Used
Pin 4 .....Not Used
Pin 5 .....Output RS-422+
Pin 6 ..... RS-422+/ RS-485+
Pin 7 ..... GND
Pin 8 .....Not Used
Pin 9 ..... Output RS-422-

J4: RS-232/RS-485 (J4 is for peripheral devices, such as UIO-256, PAP-32)
Pin 1 ..... Input RS-422-/RS-485-
Pin 2 ..... GND
Pin 3 .....Not Used
Pin 4 .....Not Used
Pin 5 ..... Output RS-422+
Pin 6 ..... Input RS-422+/RS-485+
Pin 7 ..... GND
Pin 8 .....Not Used
Pin 9 ..... Output RS-422-

J5: RS-485 (J5 is PAP-32)
Pin 1 .....RS-485 -
Pin 2 .....GND
Pin 3 ..... Not Used
Pin 4 ..... Not Used
Pin 5 ..... Not Used
Pin 6 .....RS-485 +
Pin 7 .....GND
Pin 8 ..... Not Used
Pin 9 ..... Not Used

J6: RS-232 (J6 is undefined)
Pin 1 ..... RS-485 -
Pin 2 ..... GND
Pin 3 ..... Not Used
Pin 4 ..... Not Used
Pin 5 ..... Not Used
Pin 6 ..... RS-485 +
Pin 7 .....GND
Pin 8 ..... Not Used
Pin 9 ..... Not Used

USB Connectors (front end and back end J7)

Connector Type ..... Standard USB

Ethernet Interface Port (J8)

Connector Type ..... RJ-45 standard
10 base-T (Cat 3) /
100 Base Tx (Cat5)

GPIO Interface Port (J9)

Connector Type: 25-pin Female D-sub

Pin 1..... Input 1
Pin 2.....Common
Pin 3..... Input 2
Pin 4.....Common
Pin 5..... Input 3
Pin 6.....Common
Pin 7..... Input 4
Pin 8.....Common
Pin 9.....GND
Pin 10.....GND
Pin 11.....GND
Pin 12..... +5 V
Pin 13..... +5 V
Pin 14.....Relay 1 NC
Pin 15.....Relay 1 NO
Pin 16.....Common
Pin 17.....Relay 2 NC
Pin 18.....Relay 2 NO
Pin 19.....Common
Pin 20.....Relay 3 NC
Pin 21.....Relay 3 NO
Pin 22.....Common
Pin 23.....Relay 4 NC
Pin 24.....Relay 4 NO
Pin 25.....Common

NOTE: The pin-out of this connect does not confirm to the standard pin-out of Zeus, Zeus II, ADAM CS, or ADAM and cannot be directly connected to the GPI connector of the RVON I/O. **It requires a custom cable assembly**.

Hotlink Connectors

Coax Type (J10 - J11 .....RG6 BNC Female
.....75 Ohm coax connector
Fiber Optic Type..... HFCT-5208M
(single mode transceiver)
- 1300 nm laser based
transceiver in standard 1 x 9
mezzanine package for links
of 15km nominal with single
mode fiber cables.

The fiber cable recommended for Cronus Single mode SM SC-SC Duplex type. Two SC-SC simplex pair will work, but you will have to verify which end to connect to each other.

Physical

Dimensions.....19w x 3.5h x 14 deep
(482.6mm x 88.9mm x 355.6mm)
Weight ..... 14.15lbs (6.41 kilograms)

Environment

Operating.....0°C to 50°C (32°F to 122°F)
Storage .....-20°C to 75°C (-4°F to 167°F)+

MDR Connector

Pin Number	Port	Function
8	1	Data +
33	1	Data -
24	1	Audio To Matrix +
49	1	Audio To Matrix -
25	1	Audio From Matrix +
50	1	Audio From Matrix -
7	2	Data +
32	2	Data -
22	2	Audio To Matrix +
47	2	Audio To Matrix -
23	2	Audio From Matrix +
48	2	Audio From Matrix -
6	3	Data +
31	3	Data -
20	3	Audio To Matrix +
45	3	Audio To Matrix -
21	3	Audio From Matrix +
46	3	Audio From Matrix -
5	4	Data +
30	4	Data -
18	4	Audio To Matrix +
43	4	Audio To Matrix -
19	4	Audio From Matrix +
44	4	Audio From Matrix -
4	5	Data +
29	5	Data -
16	5	Audio To Matrix +
41	5	Audio To Matrix -
17	5	Audio From Matrix +
42	5	Audio From Matrix -
3	6	Data +
28	6	Data -
14	6	Audio To Matrix +
39	6	Audio To Matrix -
15	6	Audio From Matrix +
40	6	Audio From Matrix -
2	7	Data +
27	7	Data -
12	7	Audio To Matrix +
37	7	Audio To Matrix -
13	7	Audio From Matrix +
38	7	Audio From Matrix -
1	8	Data +
26	8	Data -
10	8	Audio To Matrix +
35	8	Audio To Matrix -
11	8	Audio From Matrix +
36	8	Audio From Matrix -

Determining the Master System From the Slave Systems

By default, Cronus is set to operate in *stand alone* mode. You will need a license file to link Cronus frames together. In order to link 2 or more Cronus systems together, each must have the optional linking firmware installed. To purchase the firmware, contact RTS sales.

Setting the master frame is done through the display panel menu, as well as cabling the frames together.

To **configure the master frame**, do the following:

1. From the display panel of the frame you want to configure, tap the **ENC1** knob.
   SET FRAME ID appears.
2. Tap the **ENC1** knob once.
   SLAVE appears.
3. Tap **ENC1**.
   AUTO CONFIG appears.
4. Turn the **ENC1** knob to select Auto Config, Frame ID 2, Frame ID 3, or Frame ID 4.

NOTE: Once you have set the Master frame you can set the rest of the frames by using autoconfig.

To cable Cronus, use the coaxial connectors located on the back panel (see Figure 32 on page 6). On the first frame connect the two outside coax ports to the two inside coax ports on frame two. For more information, see Figure 35 on page 11. This determines the master frame and the first slave. Repeat this procedure with the two remaining frames.

In the way the system is cabled, the master is indicated by the two inside coax ports left open. The two coax ports on the master frame are used to connect to the matrix (ADAM system).

NOTE: Cronus has an internal mixing card, when not connected to an ADAM, that acts as a Master Controller. However, when Cronus is connected to the ADAM, the Matrix system card acts as a slave to the ADAM controller(s).

DIP Switch Settings

Switch 1: **AZedit Baud Rate**

Default Setting: CLOSED (38.4K; 38,400 kbps)

Description: Baud rate is a measure of the communications speed for a serial port. Baud is measured in bits per second or bps. By default, AZedit is set for COM1 and 38.4K.

NOTE: The baud rate set with Switch 1 must match the baud rate set in AZedit. To see what the baud setting is in AZedit, do the following:

1. Open **AZedit**.
   The Keypanels/Ports screen appears.
2. From the Options menu, select **Communications**.
   The Communications screen appears showing the AZedit session connection configurations.

Settings OPEN: 9600 baud
CLOSED: 38.4K baud (default)

Switches 2-7 **Not Available**

Switch 8 **Reserved. Must be kept in OPEN position.**

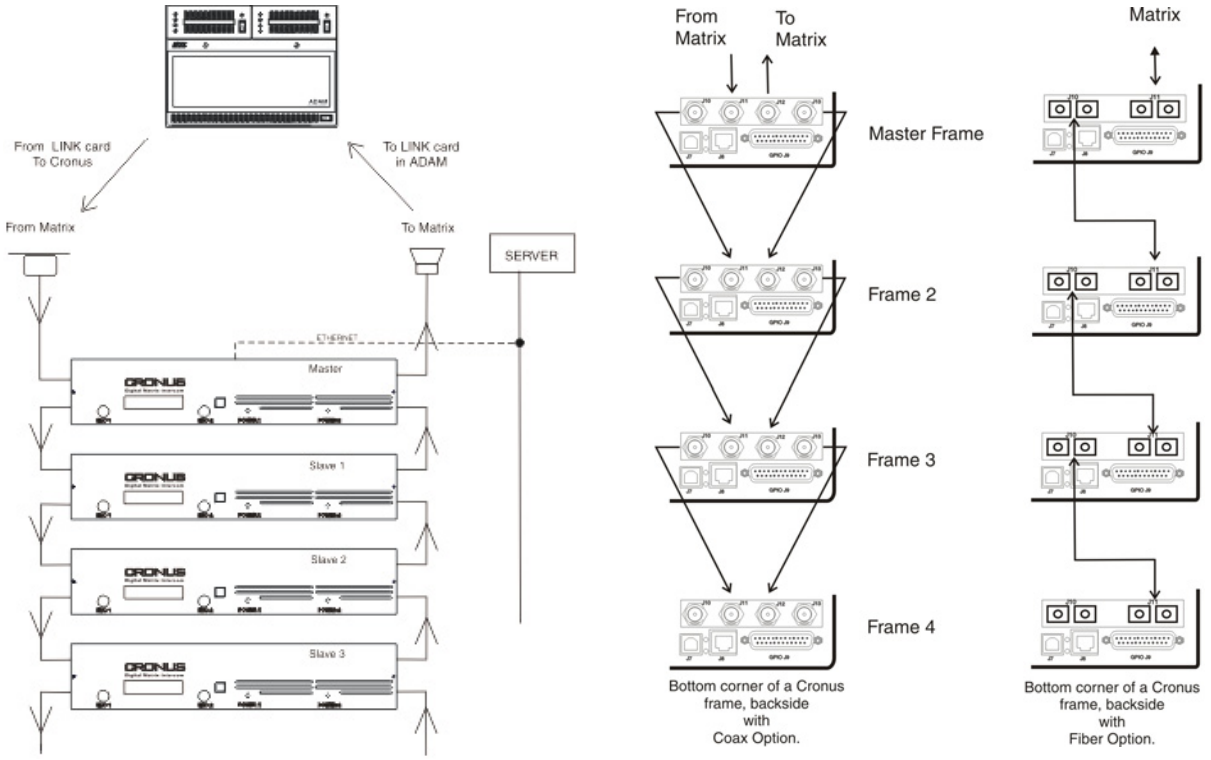


FIGURE 35. The Cronus Intercom System has four frames, one Master and three Slave stations (see system diagram on left) connected via coaxial cables (see cabling diagram at right). Each frame can support up to 32 ports, and each system can have a maximum of 128 ports (all four frames available).

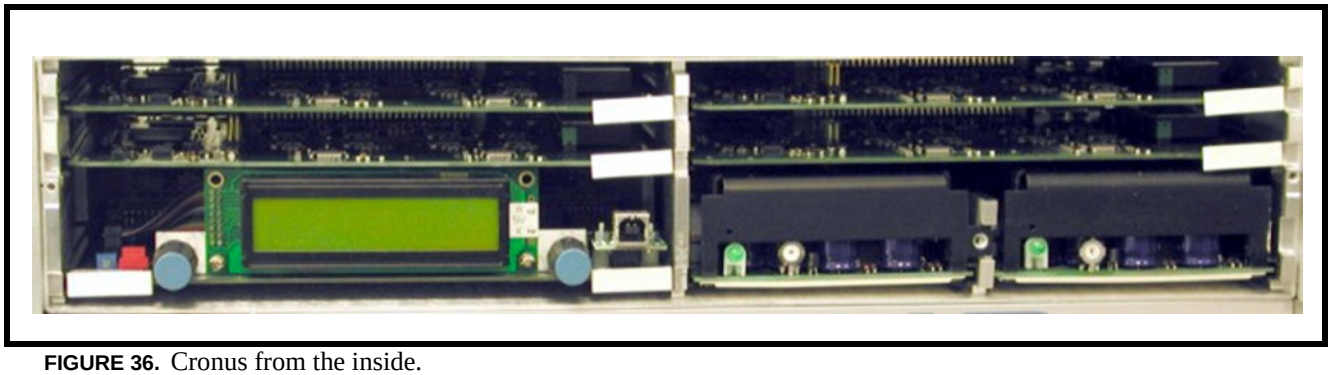


FIGURE 36. Cronus from the inside.

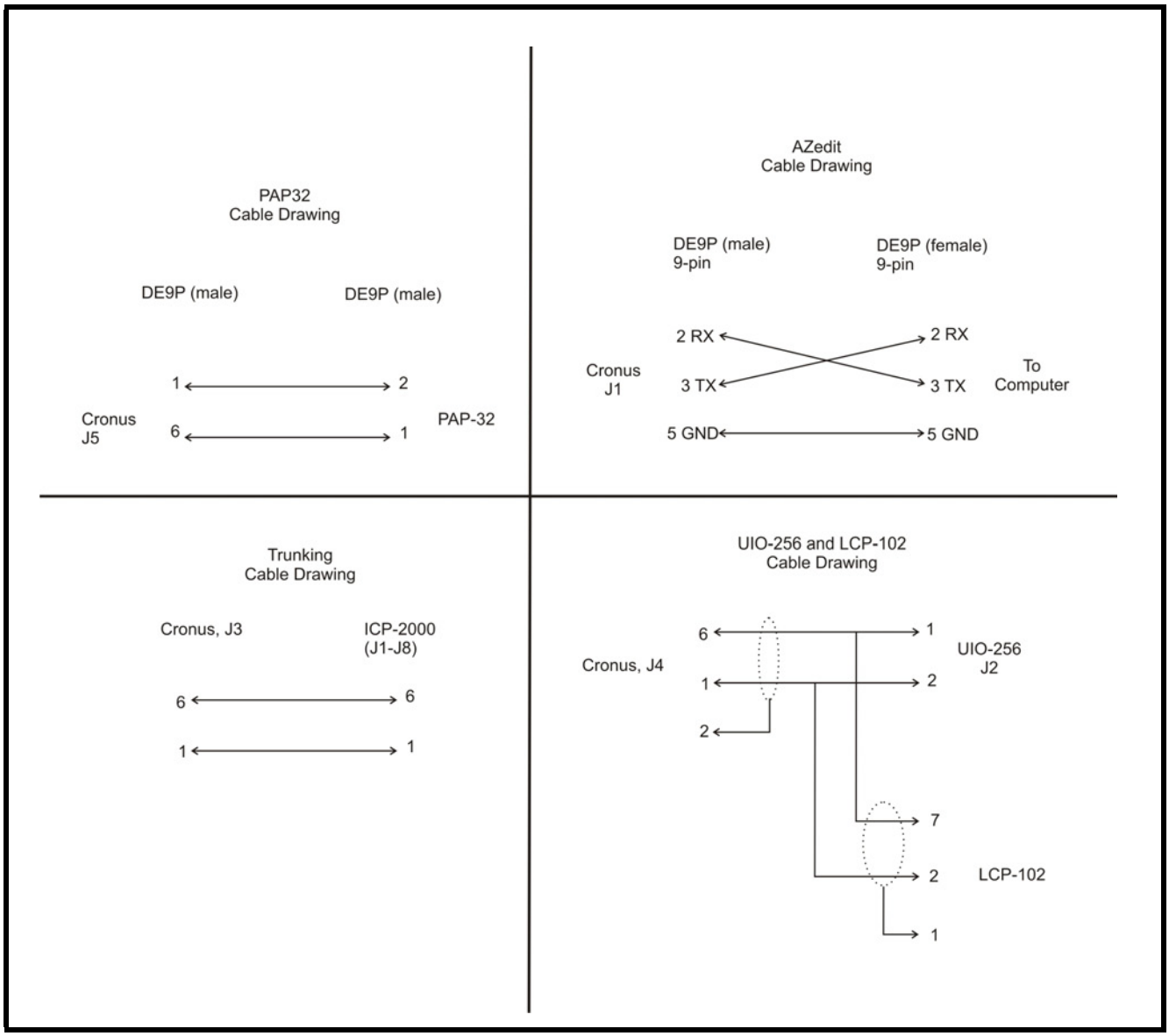


FIGURE 37. Cable drawings for PAP32, AZedit, Trunking and UIO-256/LCP-102.

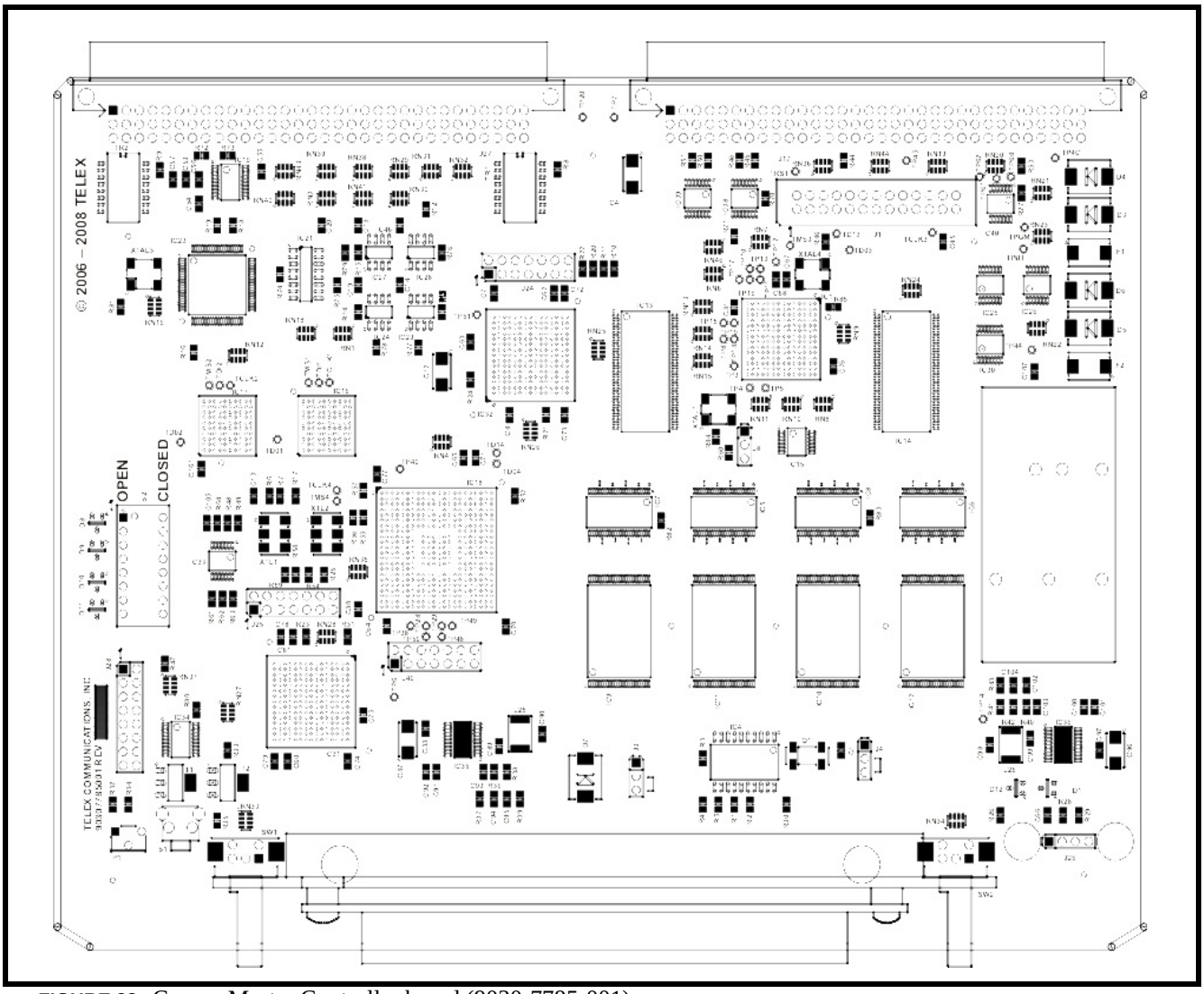


FIGURE 38. Cronus Master Controller board (9030-7785-001)

Default Jumper Settings for the Master Controller Board

CONNECTION	DESCRIPTION	DEFAULT SETTING
J3	Write Protect Flash Chips IC9 and IC10 (Code Flash)	Populate jumper across pins 2 and 3.
J4	Write Protect Flash Chips IC11 and IC12 (Config Flash)	Populate jumper across pins 2 and 3.

NOTE: If you have board 9030-7785-000, see “Cronus Master Controller Card 9030-7785-000” on page 91 for the Default Jumper settings.

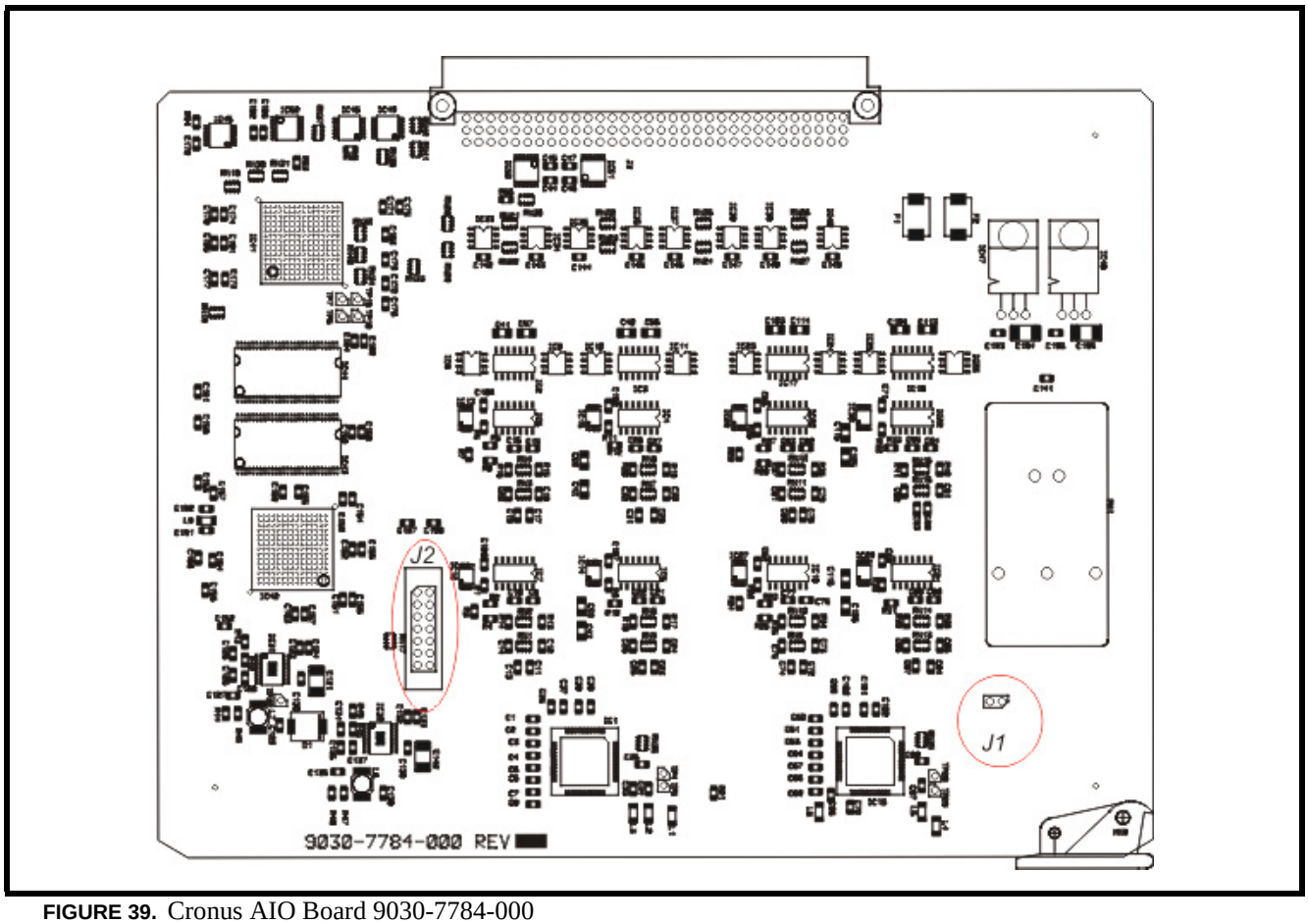


FIGURE 39. Cronus AIO Board 9030-7784-000

Jumper	Description	Default Setting
J1	5 volt Power Isolation	Populate Jumper across J1
J2	DSP Debug Port	Populate Jumpers across J2: Pins 5-6 Pins 7-8 Pins 9-10 Pins 11-12

CHAPTER 2

Cronus Menu Structure

Cronus Menu System Introduction

1. On the front panel of the Cronus system, tap the **ENC1** encoder knob.
   SET FRAME ID appears.
2. Turn the **ENC1** encoder knob clockwise to scroll forward or counter-clockwise to scroll backwards through the list of menus.
   By scrolling, you will see Status or Version.
3. Tap the **ENC1** encoder knob to enter a menu.

Within a menu:

1. Turn the **ENC1** encoder knob clockwise to scroll forward, and counter-clockwise to scroll backward through a list of menus.
2. Tap the **ENC1** encoder knob to enter a menu.
   or
   Tap the **ENC1** encoder knob twice to exit a menu or press the encoder knob for 3 - 5 seconds to exit the menu system.

Configure Menu

Set Frame ID

In a single frame Cronus system, the frame will always be Stand Alone (or the Master frame). In a multi-frame system, the first time Cronus is powered on, each frame will show as Frame 1 and will need to be configured, either manually or by autoconfig, to designate which frame it is.

To **set the FRAME ID**, do the following:

1. Tap the **ENC1** knob.
   Configure appears.
2. Tap the **ENC1** knob.
   Frame ID appears.
3. Tap the **ENC1** knob.
   Set Frame ID displays.
4. Tap the ENC1 knob.
   SLAVE Frame Set Slave ID displays.

5. Tap the **ENC1** knob.
   Auto Config displays. You can either have auto-config set the frame or you can manually set the frame ID by turning the ENC1 knob to scroll through the Frame ID options.
6. Turn the **ENC1** knob to scroll through the choices (Auto Config, Frame ID 2, Frame ID 3, or Frame ID 4).
7. Tap the **ENC1** knob to make your selection.

IFB Program INs

I/O Gains

I/O Gain is the level of audio at which you hear and are heard. There may be occasions where you need to adjust the gain for some specific intercom port. For example, a belt pack operator may want to monitor a party line, but at a lower level than the normal intercom volume. Or, a beltpack operator may want to listen to the background music coming from some intercom input port, but at a reduced level.

To **set Gain from the front panel of Cronus**, do the following:

1. Tap the **ENC1** knob.
   Configure appears.
2. Tap the **ENC1** knob.
   Frame ID appears.
3. Turn the **ENC1** knob to I/O Gains.
4. Tap the **ENC1** knob.
   Select Port appears. There are 32 ports from which to select.
5. Turn the ENC1 knob to the port you want.
6. Tap the **ENC1**.
   IN Gain and OUT Gain appears.
7. Use the ENC1 knob to adjust the **IN Gain**.
   OR
   Use the ENC2 knob to adjust the **OUT Gain**.

   NOTE: You can change the gain levels in AZedit and see the results on Cronus almost immediately. For more information on gain levels, see Figure 32 on page 6.

Vox Thresholds

Vox Threshold is the level of audio at which a channel becomes active. When the threshold is set, the microphone will not turn on until the set audio level hits the set threshold. This prevents a channel from staying active when no one is around in a high activity area.

To **set and enable Vox Thresholds from the front panel of Cronus**, do the following:

1. Tap the **ENC1** knob.
   Configure appears.
2. Tap the **ENC1** knob.
   Frame ID appears.
3. Turn the **ENC1** knob to Vox Thresholds
   Threshold appears.
4. Tap the **ENC1** knob.
   Select Port appears.
5. Turn the **ENC1** knob to the port to be set.
   You can set the thresholds on all 32 ports on the Cronus.
6. Tap the **ENC1** knob to select the port.
7. Turn the **ENC1** knob to set the threshold level (-127 dB to 0.0 dB)

8. Double-tap the **ENC1** knob to exit the threshold set menu item.
   Port displays.
9. Turn the **ENC1** knob to Hold Time.
10. Tap the **ENC1** knob.
    Hold Time appears.
11. Turn the **ENC1** knob to set the hold time (up to 12.5 seconds).

    NOTE: Hold time is the amount of time the VOX will stay active on a port before closing the port.

12. Double-tap the **ENC1** knob to exit the Hold Time menu item.
    Port displays
13. Turn the **ENC1** knob to Enable.
14. Tap the **ENC1** knob.
    Enable appears. You can Enable or Disable from this point.
15. Double-tap the **ENC1** knob to exit the Enable menu item.

    NOTE: You can also set the VOX within AZedit. For more information about setting VOX in AZedit see "Vox Settings in AZedit" on page 21.

Status Menu

The **Status Menu** displays settings for the following:

AZedit
Crosspoints
Frames
GPI Input
GPI Output
Keypanels
Links

NOTE: This chapter covers the menu display for the Master frame (Frame 1). On slave frames the only display you see under Status menu is Links.

Status, AZedit

AZedit displays if there is an active connection.

NOTE: This only shows the status of the primary serial cable.

1. Turn the **ENC1** knob to scroll to Status.
2. When Status is displayed, tap the **ENC1** knob.
   AZedit displays.
3. Tap the **ENC1** knob
   The status of AZedit appears.
   OK = there is a connection to AZedit.
   -- = there is no connection to AZedit.

Status, Crosspoints

The **Crosspoints Status** displays the status of each crosspoint closure. You can also view Crosspoint Status in AZedit.

1. Turn the **ENC1** knob to scroll to Status.
2. Tap the **ENC1** knob.
   AZedit displays.
3. Turn the **ENC1** knob to scroll to Crosspoints.
4. Tap the **ENC1** knob.
   The status of the crosspoints for input 1 and outputs 1 and 2 is shown.
5. Turn the **encoders** to change which crosspoints are displayed.
   ENC1 adjusts the input port. ENC2 adjusts the output port.
6. Once the status you want to display appears, tap the **ENC2** knob.
   The Crosspoint status appears.

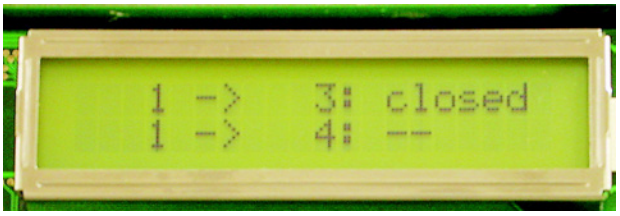


FIGURE 40. Crosspoint Status Display

Status, Frames

Frames displays the status of each of the Cronus frames. It tells if the frame is still active or if it has been deactivated.

1. Turn the **ENC1** knob to scroll to Status.
2. When Status is displayed, tap the **ENC1** knob.
   AZedit displays.
3. Turn the **ENC1** knob to scroll to Frames.
4. Tap the **ENC1** knob.
   The status is shown for frames 1 & 2.
5. Turn the **encoders** to display the status of the other frames.

Status, GPI Input

GPI Input displays the status of each GPI (General Purpose Input) assigned in the system. The GPI Input allows an external piece of equipment to trigger the intercom. For example, using an “on-air” tally to dim or mute specific outputs. GPI Inputs are created within AZedit.

1. Turn the **ENC1** knob to scroll to Status.
2. When Status is displayed, tap the **ENC1** knob.
   AZedit displays.
3. Turn the **ENC1** knob to scroll to GPI Input.
4. Tap the **ENC1** knob.
   1-64 displays.
5. Turn the **ENC1** knob to scroll through the GPI Input assignments.

Status, GPI Output

GPI Output displays the status of each GPI Output assigned in the system. GPI output is similar to the GPI Input, except instead of triggering an action on the intercom, the intercom is programmed to perform a function as a result of an action on the intercom. For example, when a port is connected to a 2-way radio, the radio is normally in receive mode. Use a GPI Output to trigger the transmitter whenever anyone talks to the port.

1. Turn the **ENC1** knob to scroll to Status.
2. When Status is displayed, tap the **ENC1** knob.
   AZedit displays.
3. Turn the **ENC1** knob to scroll to GPI Output.
4. Tap the **ENC1** knob.
   1-64 displays.
5. Turn the **ENC1** knob to scroll through the GPI Output assignments.

Status, Keypanels

The **Keypanel** menu displays the status of each of the keypanels in the Cronus system.

1. Turn the **ENC1** knob to scroll to Status.
2. When Status is displayed, tap the **ENC1** knob.
   AZedit displays.
3. Turn the **ENC1** knob to scroll to Keypanels.
4. Tap the **ENC1** knob.
   The status is shown for keypanels 1 & 2.
5. Turn the **encoders** to display the status of the other keypanels (up to 32 keypanels per frame).
   The status will display as OK or blank.

Status, Links

The **Links** menu displays the status of the links (connections) between frames, see “Cronus System Diagram and Frame Cabling” on page 11. Each frame in the system has two links, Link A and Link B. Link A on each frame connects to the preceding frame (connecting to Link B).

1. Turn the **ENC1** knob to scroll to Status.
2. When Status is displayed, tap the **ENC1** knob.
   AZedit displays.
3. Turn the **ENC1** knob and scroll to Links.
4. Tap the **ENC1** knob.
5. Turn the **ENC1** knob to scroll through the Links.

You should check the status of the Frame Clock and the Link to each frame. This is good for diagnostic troubleshooting.

NOTE: Frame 1 (Master) will only show the Frame 2 status because it only connects to one other Cronus frame.

Version, Intercom

The **Version, Intercom** menu, displays the firmware version that is current on the intercom.

NOTE: For Firmware upgrades, contact Telex Customer Service. The Cronus Firmware can be upgraded through AZedit. See “Download Firmware for Cronus” on page 29, for more information.

Menu Access

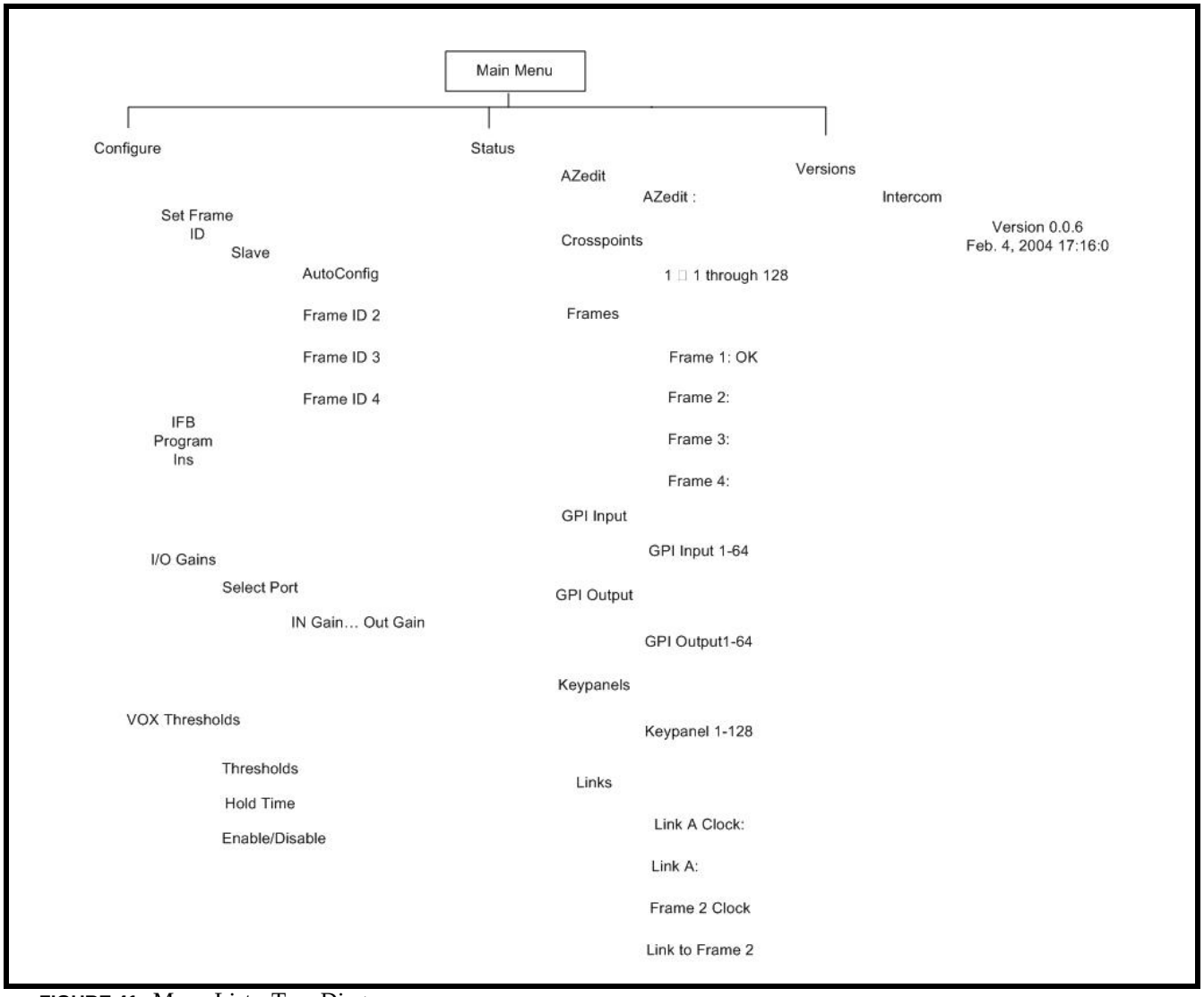


FIGURE 41. Menu List - Tree Diagram

1. On the front panel of the Cronus system, tap the **ENC1** encoder knob.
   The word Status appears.
2. Turn the **ENC2** encoder knob clockwise to scroll forward or counter-clockwise to scroll backwards through the list of menus.
3. Tap the **ENC1** encoder knob to enter a menu.

Within a menu:

1. Turn the **ENC1** encoder knob clockwise to scroll forward, and counter-clockwise to scroll backward through a list of menus.
2. Tap the **ENC1** encoder knob to enter a menu.
   or
   Tap the **ENC1** encoder knob twice to exit a menu or press the encoder knob for 3 - 5 seconds to exit the menu system.

NOTE: In Slave mode, the Status Menu will only show Links Status.

Vox Settings in AZedit

Cronus and the AIO-16 card are the only devices presently that support Vox. Vox refers to voice activation. This means that once audio is passed through Cronus or AIO-16 at a preset threshold level, the audio lines are open for conversation between ports.

With Cronus, you can set the Vox threshold from the front panel or you can set it through AZedit. In AZedit there are two ways to access the Vox Settings screen.

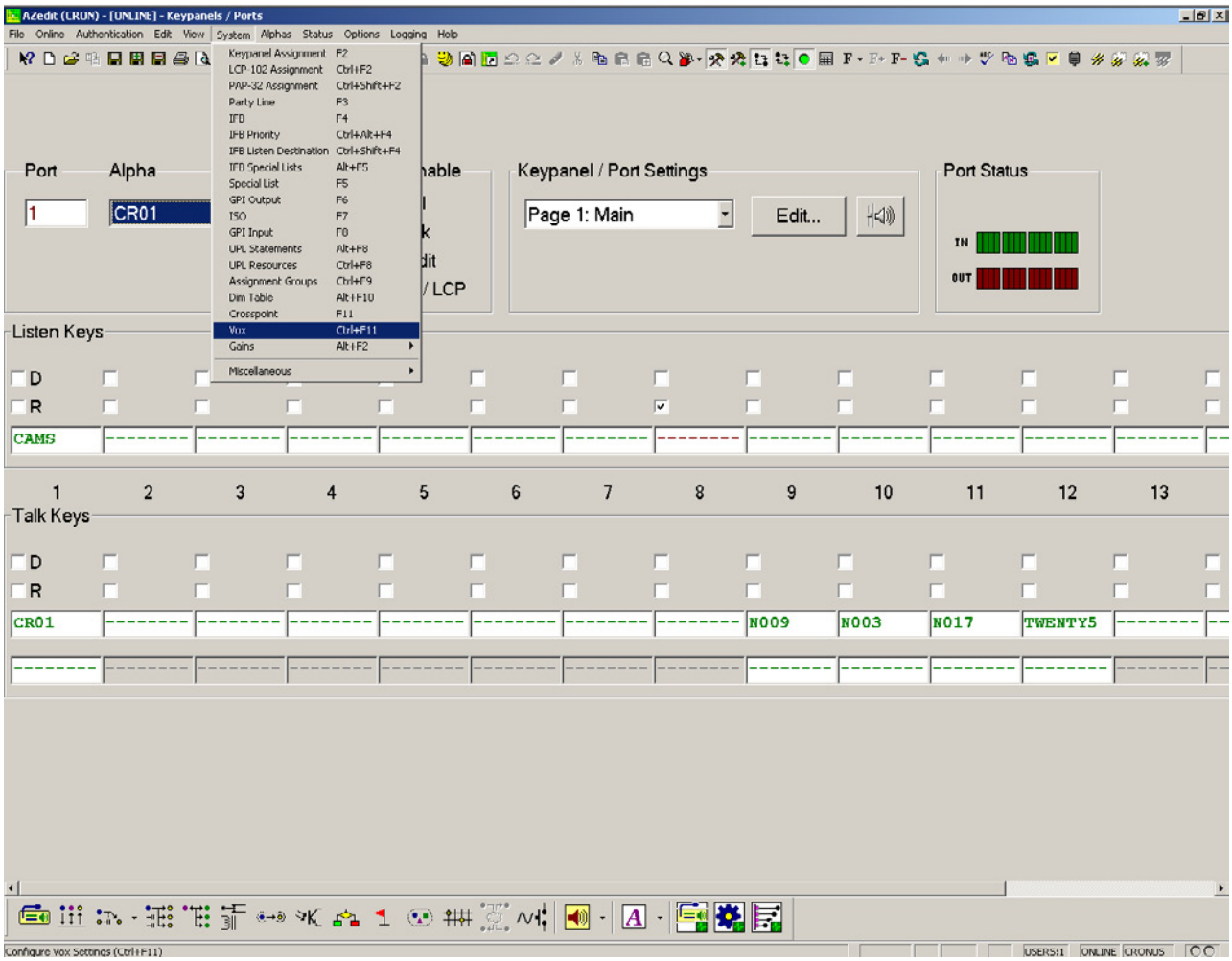
NOTE: AZedit must be at version 2.09.0 or later.

- An icon on a customized tool bar.
- From the System menu.

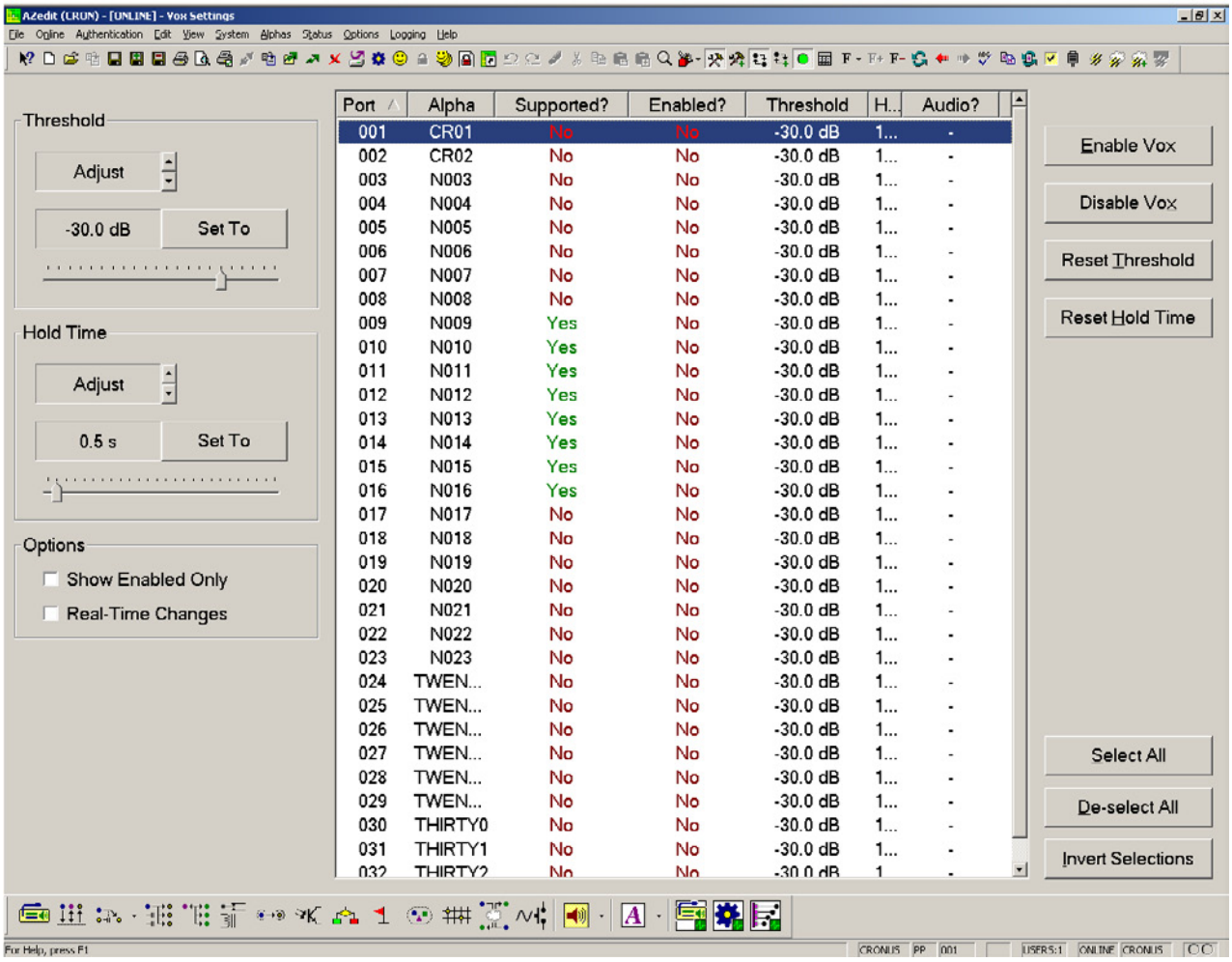
Accessing Vox

To **access the Vox Settings screen from the System menu**, do the following:

1. From the System menu in AZedit, select **Vox**.
   The Vox Settings Screen appears.



NOTE: You can change the threshold levels and hold times of more than one port at a time by pressing the **CTRL** key and clicking the ports you want to change.


AZedit (CRUN) - [ONLINE] - Vox Settings
File Online Authentication Edit View System Alphas Status Options Logging Help
Threshold
Adjust
-30.0 dB
Set To
Hold Time
Adjust
0.5 s
Set To
Options
Show Enabled Only
Real-Time Changes
Port
Alpha
Supported?
Enabled?
Threshold
H...
Audio?
001 CR01 No No -30.0 dB 1... -
002 CR02 No No -30.0 dB 1... -
003 N003 No No -30.0 dB 1... -
004 N004 No No -30.0 dB 1... -
005 N005 No No -30.0 dB 1... -
006 N006 No No -30.0 dB 1... -
007 N007 No No -30.0 dB 1... -
008 N008 No No -30.0 dB 1... -
009 N009 Yes No -30.0 dB 1... -
010 N010 Yes No -30.0 dB 1... -
011 N011 Yes No -30.0 dB 1... -
012 N012 Yes No -30.0 dB 1... -
013 N013 Yes No -30.0 dB 1... -
014 N014 Yes No -30.0 dB 1... -
015 N015 Yes No -30.0 dB 1... -
016 N016 Yes No -30.0 dB 1... -
017 N017 No No -30.0 dB 1... -
018 N018 No No -30.0 dB 1... -
019 N019 No No -30.0 dB 1... -
020 N020 No No -30.0 dB 1... -
021 N021 No No -30.0 dB 1... -
022 N022 No No -30.0 dB 1... -
023 N023 No No -30.0 dB 1... -
024 TWEN... No No -30.0 dB 1... -
025 TWEN... No No -30.0 dB 1... -
026 TWEN... No No -30.0 dB 1... -
027 TWEN... No No -30.0 dB 1... -
028 TWEN... No No -30.0 dB 1... -
029 TWEN... No No -30.0 dB 1... -
030 THIRTY0 No No -30.0 dB 1... -
031 THIRTY1 No No -30.0 dB 1... -
032 THIRTY2 No No -30.0 dB 1 -
Enable Vox
Disable Vox
Reset Threshold
Reset Hold Time
Select All
De-select All
Invert Selections
For Help, press F1
CRONUS PP 001
USERS:1
ONLINE CRONUS

SCREEN ITEM	FIELD TYPE	DESCRIPTION
Threshold		
Adjust	arrow keys	Use the **UP** or **DOWN** arrow keys to increase or decrease the vox threshold by.5 dB (-127 dB to 0.0 dB). You can see the level adjustments in the parameter display window (to the right). **NOTE:** You can select multiple ports to change at the same time. However, when you increase or decrease the threshold of multiple ports the levels change from each port's starting dB level. For example, Port 002 is set to -82.5 dB and Port 010 is set to -30.0. If both are selected and the vox threshold is increased by clicking the up arrow twice the ending threshold for each port would be as follows: Port 002 = -81.5 Port 010 = -29.0
Threshold Level	display box	The **Threshold Level** display box displays the threshold level selected by the slider bar below.

SCREEN ITEM	FIELD TYPE	DESCRIPTION
Threshold adjust	slider	The **Threshold Adjust** slider allows you to set the vox threshold by moving the slider right (increase) or left (decrease). **NOTE:** This sets the threshold to the level you set by the slider bar. It *does not* increase or decrease the threshold from the individual port starting dB. **1.** Slide the **threshold slider** bar to the level you want to set the port (s) selected.
Set To	button	The **Set To** button activates the Threshold Level slider selection. The Set To button must be clicked to accept the threshold level. **1.** Once the threshold slider is at the desired threshold level, click **Set To.**
Hold Time		
Adjust	arrow keys	Use the **UP** or **Down** arrow keys to increase or decrease the time the port is active from meeting the threshold level set above. Once a port meets or exceeds its threshold level, the hold time determines how long that port will stay active before closing (up to 12.5 seconds). You can see the adjustments in the parameter display window (to the right) **NOTE:** You can select multiple ports to change at the same time. However, when you increase or decrease the hold time of multiple ports the time changes from each port's starting point. For example, Port 002 has a hold time of 0.7 seconds and Port 010 has a hold time of 1.0. If both are selected and the hold time is increased by clicking the up arrow twice the ending threshold for each port would be as follows: Port 002 = 1.7 Port 010 = 2.0
Hold Time	display box	The **Hold Time** display box displays the hold time level selected by the slider bar below.
Hold Time Adjust	slider	The **Hold Time Adjust** slider allows you to set the time by moving the slider right (increase) or left (decrease). **NOTE:** This sets the threshold to the level you set by the slider bar. It *does not* increase or decrease the threshold from the individual port starting dB. **1.** Slide the **hold time slider** bar to the level you want to set the port (s) selected.
Set To	button	The **Set To** button activates the Hold Time slider selection. The Set To button must be clicked to accept the hold time. **1.** Once the hold time slider is at the desired level, click **Set To.**
Options		
Show Enabled Only	check box	The **Show Enabled Only** check box, when selected will only display the **Vox enabled** ports in the display list to the right. When the check box is cleared, all ports are displayed.
Real-Time Changes	check box	The **Real-Time Changes** check box allows you to see the adjustments to the Vox and hold time dynamically on the connected device (Cronus or AIO-16). **NOTE:** When making adjustments from the front panel of the Cronus take into consideration that AZedit has a 5 second display refresh rate which will cause a delay in what is seen in the application.

SCREEN ITEM	FIELD TYPE	DESCRIPTION
Parameter Display Window		
Port	display	The **Port** column displays the port identification number for the intercom port. This identification number cannot be changed
Alpha	display	The **Alpha** column displays the label given to the port (input/output) of the matrix. Alphas are the names that appear in the alphanumeric displays on keypanels when keys are assigned to talk to destinations in the intercom system. Alpha names for intercom ports are assigned using *Port Alphas* setup. Alpha names for everything else are assigned using *Other Alphas* setup.
Supported?	display	The **Supported?** column displays whether the port is attached to a device that supports Vox (either a Cronus or AIO-16 card). **NOTE:** Cronus and AIO-16 are the only devices, presently, that support Vox. When a green **Yes** is displayed, the device supports Vox. When a red **No** is displayed, the device does not support Vox.
Enabled?	display	The **Enabled?** column displays whether Vox is enabled on the specific port. When a green **Yes** is displayed, Vox is enabled. When a red **No** is displayed it is not active.
Threshold	display	The **Threshold** column displays the threshold level for the specific port.
Hold Time	display	The **Hold Time** column displays the amount of time a port will stay active once the Vox threshold level has been met or exceeded.
Audio?	display	The **Audio?** column displays whether audio is being detected on the port. When a green **Yes** is displayed, audio is detected. When a red **No** is displayed, no audio is detected.
Enable Vox	button	The **Enable Vox** button enables Vox on the selected port (s). **1.** Select a **port** or **multiple ports**. **2.** Click **Enable Vox**. *Vox is enabled on the selected port (s).*
Disable Vox	button	The **Disable Vox** buttons disables Vox on the selected port (s). **1.** Select a **port** or **multiple ports** where Vox is enabled. **2.** Click **Disable Vox**. *Vox is disabled on the selected port (s).*
Reset Threshold	button	The **Reset Threshold** button resets the threshold level of the selected port (s) to default (-30 dB). **1.** Select a **port** or **multiple ports** you want to reset to the default threshold level. **2.** Click **Reset Threshold**. *The Threshold is reset to the default value*.
Reset Hold Time	button	The **Reset Hold Time** button resets the hold time of the selected port (s) to default (.5 seconds). **1.** Select a **port** or **multiple ports** you want to reset to the default hold time. **2.** Click **Reset Hold Time**. *The Threshold is reset to the default value*.
Select All	button	**Select All** selects all the list items in the current view. **1.** Click **Select All** to select all the items in the current view.

SCREEN ITEM	FIELD TYPE	DESCRIPTION
De-select All	button	**De-select All** de-selects all the list items in the current view that are selected. 1. Click **De-select All** to de-select all ports in the current screen view.
Invert Selection	button	The **Invert Selection** button reverses the order in which the list is currently displayed. 1. Click **Invert Selection** to reverse the list of ports from the current view.

Download Cronus License File

To link more than one Cronus system together, you must have linking software installed on the system (normally, this is loaded at time of purchase). If you are adding a Cronus Intercom System to an existing Cronus matrix, you may need to load a license file on your existing system.

Each license file is uniquely stamped with the MAC address of the master controller running in the intercom system.

NOTE: The Cronus system must be in "Stand Alone" state shown on the front panel display. Once the License file is loaded, the "Download License" option in the Options menu disappears.

To **download the Cronus license file**, do the following:

1. Open **AZedit**.
2. From the Options menu, select **Download License**, and then **Select a license file to download**.
   The Download License submenu appears.
3. Select the **license file to download** or use browse to navigate to the file.
4. Click **Open**.
   The License file begins to download. Once the file is downloaded, the message "AZedit download successful! The license file X:\XXX.lic was downloaded and accepted by the intercom.
5. Click **OK**.
   On the Cronus front panel, you should see Frame 1 appear after the download completes.

CHAPTER 4

Ethernet Setup for Cronus

Connecting Cronus to the PC and the Network

NOTE: The PC must be running version 2.06.07 or later of AZedit and have an Ethernet card installed.

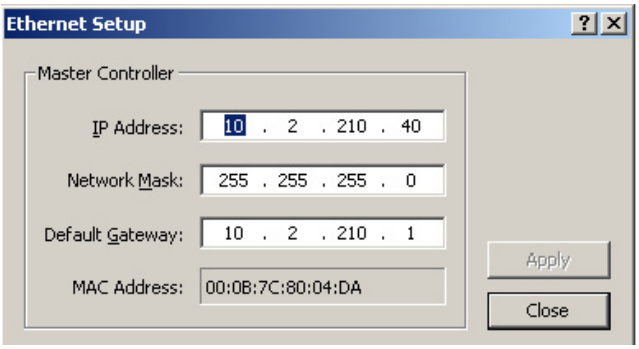
Verify Cronus is connected to the PC using either a USB (universal) or RS-232 (ADAM standard) cable. The USB drivers can be found in the AZedit software directory (C:\Telex\AZedit|V20701|USB). You may only use on USB connection (front panel or back panel) at a time.

NOTE: Cronus can support up to 32 multiple sessions of AZedit on Ethernet.

To **connect Cronus to the PC with a serial cable**, do the following:

NOTE: For more information on Network Basics, “Basic Network Configuration” on page 59.

1. Open **AZedit**.
   The Keypanels/Ports screen appears.
2. From the Options menu, select **Ethernet Setup**.
   The Ethernet Setup Screen appears.



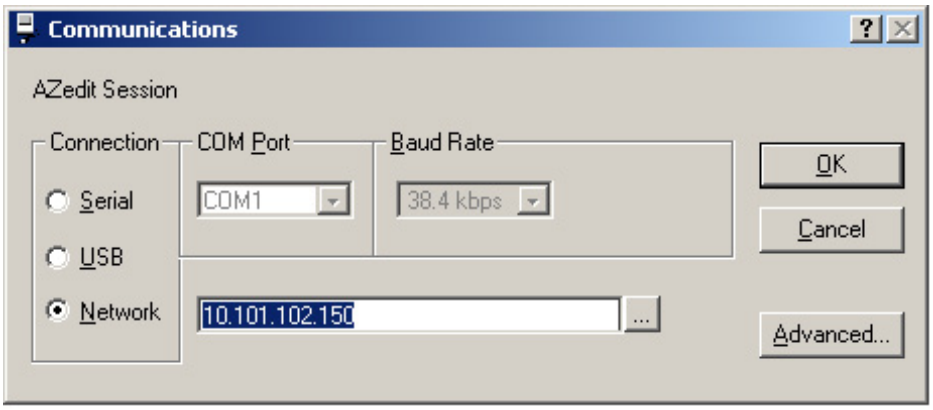
3. In the IP Address field, enter the **IP Address** for the Cronus system.
4. In the Network Mask field, enter the **Network Mask** number for the Cronus System.
5. Where appropriate, in the Default Gateway field, enter the **gateway number** for Cronus.

   NOTE: If you do not know these numbers, your system administrator can give you the IP Address and Netmask to use.

6. Click **Apply**.
7. Click **Close**.
   The Ethernet Setup window is closed.
8. Connect the **Cronus** to your network with an Ethernet cable.
9. Connect the **PC** to you network with an Ethernet cable.

Once **you have entered the IP Address and Network Mask**, do the following:

1. From the Options menu, select **Communications**.
   The Communications screen appears.



2. In the Connection area, select the **Network** radio button.
3. In the IP Address field, either enter the **Cronus IP Address** you wish to connect with, or click the **Search** button.
   The search button scans the network for any Cronus devices. If multiple units are on the network, each will appear in the list. Select the Cronus you wish to work with.
4. Click **OK**.
   The Communications screen closes.

Download Firmware for Cronus

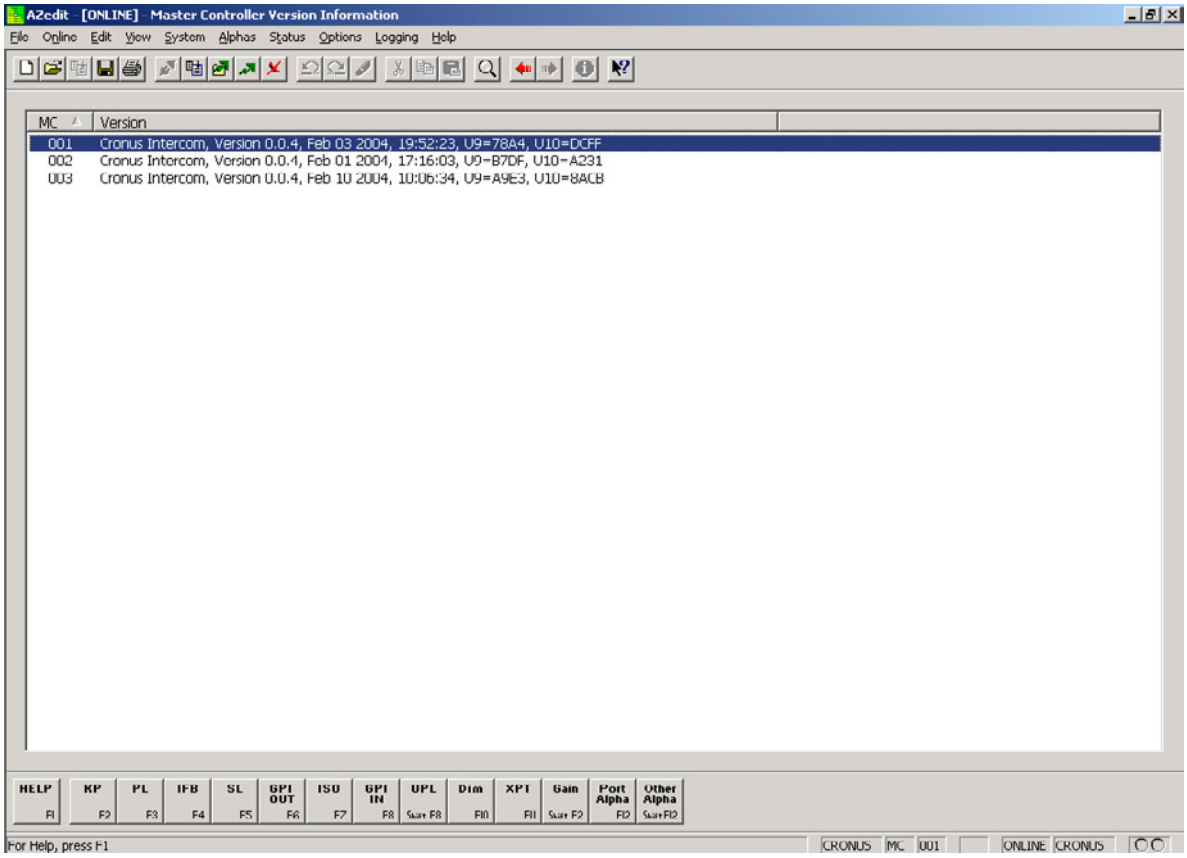
When firmware is downloaded to Cronus, all the code is put on the Master Controller card. This includes code for the AIO cards. Therefore, because the Master Controller downloads the firmware for the system and the code for the AIO cards, the download time is extended while the Master Controller pushes the AIO code out to the appropriate cards.

NOTE: Cronus must have AZedit version 2.06.07 or later.

Also, every time the system is reset or rebooted, the Master Controller card will reload each of the AIO cards with the most current version of code it is housing.

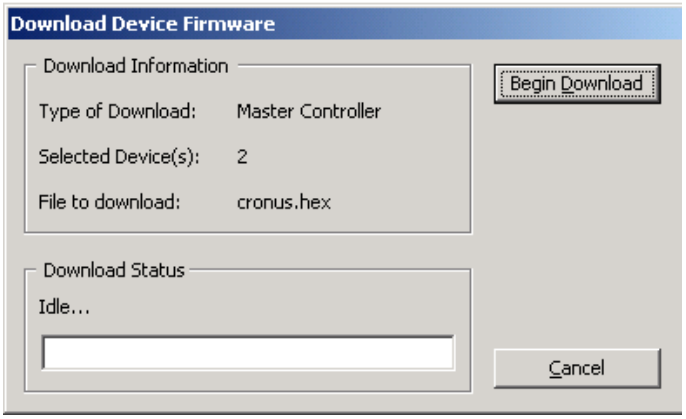
To **download firmware to the Master Controller**, do the following:

1. Open **AZedit**.
   The Keypanels/Ports screen appears.
2. From the Status menu, select **Software Versions**, then **Master Controllers**.
   The Master Controller Version Information screen appears.

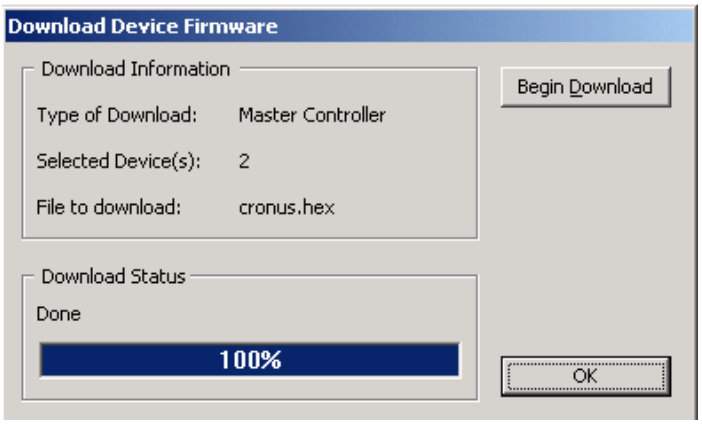


3. Highlight the **Cronus version** to be updated.
   You may select more than one version at a time by holding the CTRL key down while you select.
4. Right-click the **highlighted selections** and then select **Download Firmware**.
   The Firmware Download screen appears.
5. Using the browse feature, browse to the **file** to be downloaded.

6. Click **Open**.
   The Download Device Firmware screen appears.



7. Click **Begin Download**.
   The download begins.



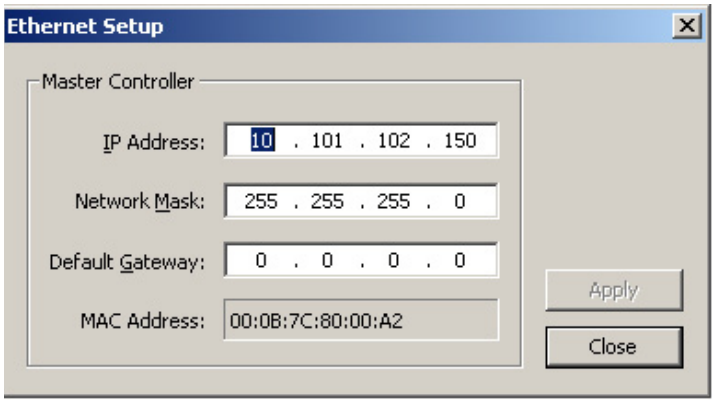
8. Once the Download is finished, click **OK**.
   The Cronus firmware download is complete. This will take a minute or two depending upon the type of connection you use (network or serial).
9. Verify the **version upgrade** in the Master Controller Version Information window.

Finding the MAC Address for Cronus

To **retrieve the MAC Address**, do the following:

1. Open **AZedit**.
   The Keypanels/Ports screen appears.
2. From the Options menu, select **Communications.**
   The Communications screen appears.
3. Verify that USB is selected.
4. Click **OK**.
   The Communications screen closes.

5. From the Options menu, select **Ethernet Setup**.
The Ethernet Setup screen appears. The MAC Address aappears at the bottom of the screen.


Ethernet Setup
Master Controller
IP Address: 10 . 101 . 102 . 150
Network Mask: 255 . 255 . 255 . 0
Default Gateway: 0 . 0 . 0 . 0
MAC Address: 00:0B:7C:80:00:A2
Apply
Close

NOTE: If you have multiple Cronus systems linked together, you will need to individually connect them to the PC to see the MAC address. You cannot look at multiple Cronus MAC Addresses at the same time.

Final Assembly Drawing

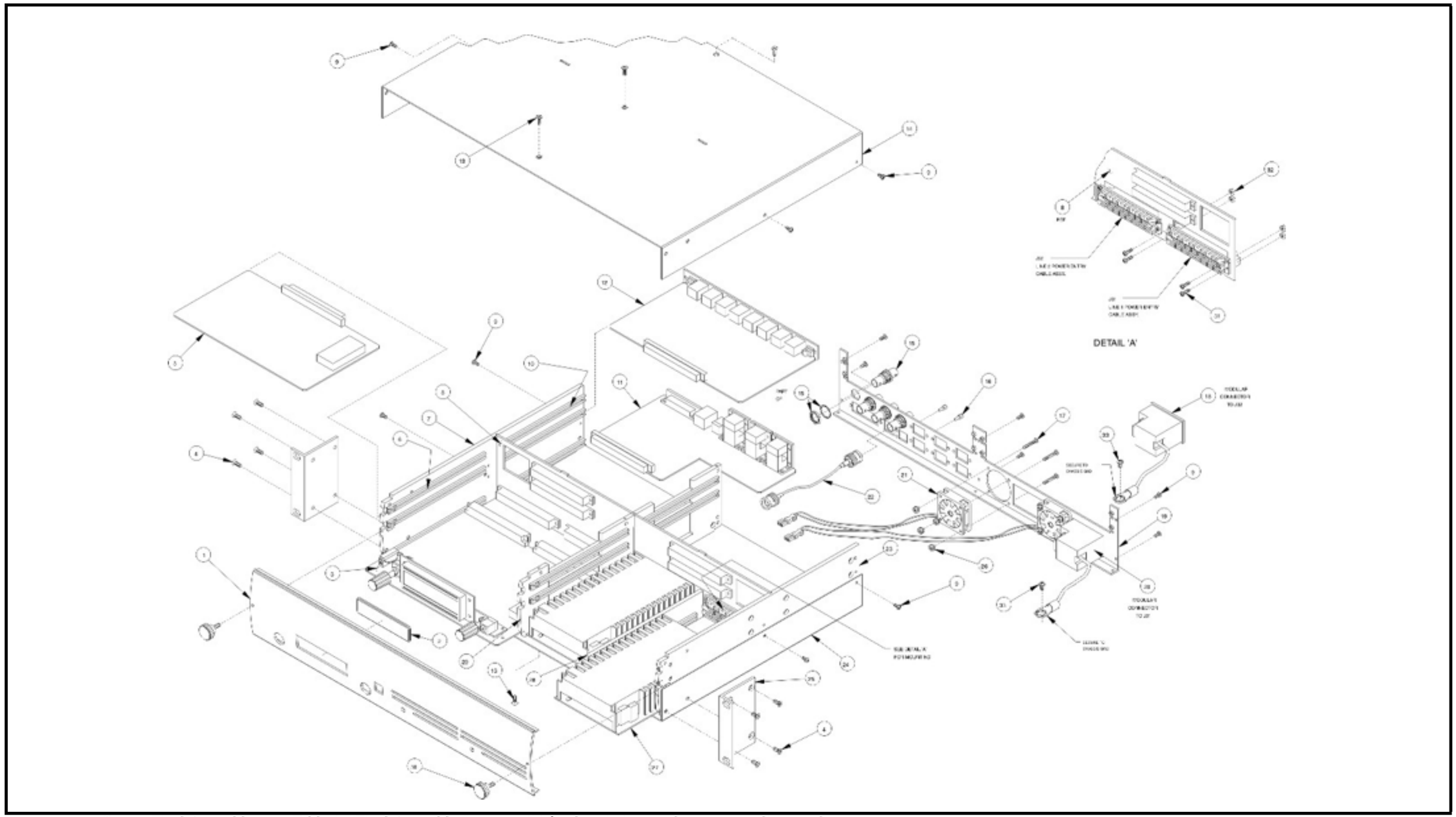


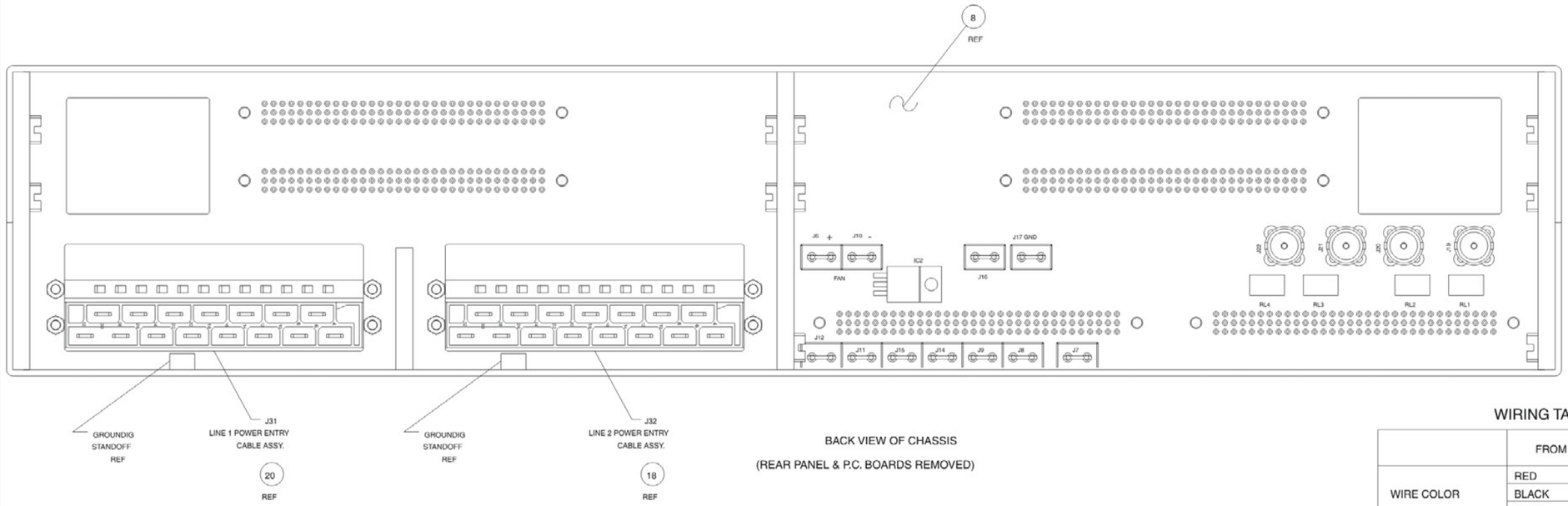
FIGURE 42. Cronus Final Assembly - see Table 1, “Final Assembly,” on page 34 for descriptions to the corresponding numbers.

Figure 1. Final Assembly

Item No.	Description	Part No.
1	Front panel, Cronus	9070-7770-000
2	Lens	9150-7770-000
3	Master Controller Assembly	9020-7770-000
4	Screw, FH, 6-32 x 3/8” LG.	51847-022
5	AI/O PC Board Assembly	9030-7784-000
6	Card Guide 6” LG	591601-001
7	Left Wall, Cronus	9110-7770-000
8	Back Plane PC Board Assembly	9110-7786-000
9	Screw, PH, 4-40 x 1/4” LG.	51845-038
10	Card Guide, 5” LG	591601-000
11	Master Controller Rear PC Board Assembly	9030-7788-000
12	AI/O Rear PC Board Assembly (RJ-12)	9020-7787-000
13	Screw, FH, 4-40 x 3/8” LG.	51847-012
14	Top Cover, Cronus	9100-7770-000
15	Bulkhead Jack, BNC, Feedthru	539074-000
16	Screwlock, 4-40	58421-000
17	Screw, PH, 4-40 x 1.0” LG	500125
18	Line 1 Power Entry Cable Assembly	2502-7770-002
19	Rear Panel, Cronus	9080-7770-004
20	Line 2 Power Entry Cable Assembly	2502-7770-003
21	Fans w/ Cable Assembly	2502-7770-004
22	Coax Cable Assembly	2502-7770-000
23	Right Wall, Cronus	9111-7770-000
24	Chassis, Cronus	9090-7770-000
25	Rack Ear, Cronus	9114-7770-000
26	Keps Nut, #4	51745-000
27	Power Supply, Switching	532073-000
28	Power Supply Wall, Cronus	9112-7770-000
29	Middle Wall, Cronus	9113-7770-000
30	Captive Panel Screw	58095-000
31	Screw, PH, 4-40 x 3/8” LG	51845-039
32	Nut, Special 4-40, Small, #4	50033-022
33	Screw, PH, 6-32 x 1/4” LG	51845-074
34	Spacer,.25 O.D. x.14 I.D., Stainless Steel	701840-000
35	Retaining Ring, External	50016-001
36	Rear Card Plate	9110-7784-003
37	Connector Key	539207-001
38	Foam Tape, Double Sided, 1” Wide	840051

Figure 1. Final Assembly

Item No.	Description	Part No.
39	AI/o Rear PC Board Assembly, MDR SCSI	9030-7800-000
40	Coax Link Module Card Plate	9110-7784-008
41	Cronus Fiber Link Module PCB	9030-7827-000
42	Fiber Link Module Card Plate	9110-7784-011
43	Fiber Link Module Cable Assy	2502-7770-005



BACK VIEW OF CHASSIS

(REAR PANEL & P.C. BOARDS REMOVED)

WIRING TABULATION

	FROM J31	TO BACK PLANE
WIRE COLOR	RED	J11
	BLACK	J14
	BLUE	J8
	FROM J32	TO BACK PLANE
WIRE COLOR	RED	J12
	BLACK	J15
	BLUE	J9
	FROM FANS	TO BACK PLANE
WIRE COLOR	RED	J6
	BLUE	J10
	FROM COAX LINKING MODULE	TO BACK PLANE
USE ITEM 22 QTY. 4	J10	J22
	J11	J21
	J12	J20
	J13	J19
	FROM FIBER LINKING MODULE (ITEM 41)	TO BACK PLANE
USE ITEM 43 QTY. 4	J1	J22
	J2	J19
	J3	J20
	J4	J21

FIGURE 43. Wiring Diagram

CHAPTER 8

RVON-C
RTS Voice Over Network for Cronus

Description of the RVON-C Voice Over Network Card

Installed directly into the Cronus Intercom frame, the RVON-C provides voice over IP (Internet Protocol) communications for the RTS® Cronus intercom system. In general, voice over IP means sending voice information in digital form using discrete packets rather than the traditional telephone network. The RVON-C delivers an integrated solution for connecting custom keypanels to the Intercom Matrix over standard IP networks by supporting 8 channels (ports) of audio IN and OUT.

The RVON-C card supports all standard, hot-swappable and configurable features through Telex's AZedit configuration software, as well as support for remote keypanels and virtual keypanels via VOIP (voice over IP).

RVON-C supports Telex® Intelligent Trunking over IP. Trunking is a method of using a relatively few audio paths for a large number of potential users. Because it is flexible, a trunked system can expand along with your business, to accommodate a growing number of users. Telex's Intelligent Trunking is proven technology, which provides the same capabilities and ease of use for intercom -seamless routing and path finding of communications between facilities regardless of distance - as does the long distance telephone system for phone calls.

RVON-C is fully compatible with internationally recognized standards and supports the following protocols: G.711, G.729AB, and G.723 (2 speeds).

Features

Installation	The RVON-C card is hot-swappable and installs in any available slot in a Cronus Intercom System. It provides a single RJ-45 Ethernet connection for use with a 10 BASE-T or 100 BASE-TX network. It also has a DB-9 connection for an RS-232 or RS-485 pass-thru port.
8 Channels of Audio IN and OUT	Expands the connectivity of the Cronus intercom by supporting 8 channels (ports) IN and OUT. Each channel has configurable network and bandwidth parameters that can be tailored to individual network functions, as well as ancillary data for keypanels and trunking control.
Ethernet Compatible	Fully Ethernet capable. The RVON-C card uses standard Ethernet protocols and is compatible with 10 BASE-T or 100 BASE-TX Ethernet compliant devices and networks.
AZedit Configurations	Users have the ability to adjust the audio parameters of each RVON-C channel to optimize the available bandwidth on the network.
Trunk Capable	The RVON-C card supports ancillary data control for use with Telex® Intelligent Trunking.
Addressing	Eight individually addressable audio channels. The RVON-C card can feed simultaneously VOIP (voice over internet protocol) capable keypanels, as well as various other matrix intercom systems.
Pass-Through Serial Port	Provides a virtual serial connection via an IP connection, which if used while trunking, may eliminate the need for multiple IP resources.

Specifications

DIGITAL

COMPRESSION	BIT RATE	CODING DELAY	PLAYOUT DELAY	BANDWIDTH
G.711	64K	125µs	20-60 ms	160-224 kbps
G.728AB	8 K	10 ms	20-120 ms	32-112 kbps
G.723	5.3K / 6.3 K	30 ms	60-120 ms	29-45 kbps
*Data Rate depends on Codec selection				

NOTE: The Playout Delay and Bandwidth depend on the configured amount of audio per packet.

CONNECTIONS - PINOUTS

RJ-45 Ethernet via backcard

RJ-45	Function
1	Ethernet TPO+
2	Ethernet TPO-
3	Ethernet TPI+
4	TPO+
5	TPO-
6	Ethernet TPI-
7	TPI+
8	TPI-

DB-9 Serial Port via backcard

DB-9 Pin	Function
1	N/A
2	RXD, RVON-C Received Data
3	TXD, RVON-C Received Data
4	N/A
5	GND
6	N/A
7	N/A
8	N/A
9	N/A

Power.....5W Typical

Physical .....8.25”W x 6.25”L

RVON-C JUMPERS and CONNECTIONS

A selectable RS-232/485 serial port is at connector J1 Serial (see Figure 45 on page 41) on the back card. Jumper connections on J10, J11, and J12 (on the front card, see Figure 44 on page 40.) select the signal mode on J1.

- When J10, J11, and J12 are jumped from pins 1 to 2- J1 is configured for RS485.
- When J10, J11, and J12 are jumped from pins 2 to 3 - J1 is configured for RS232.

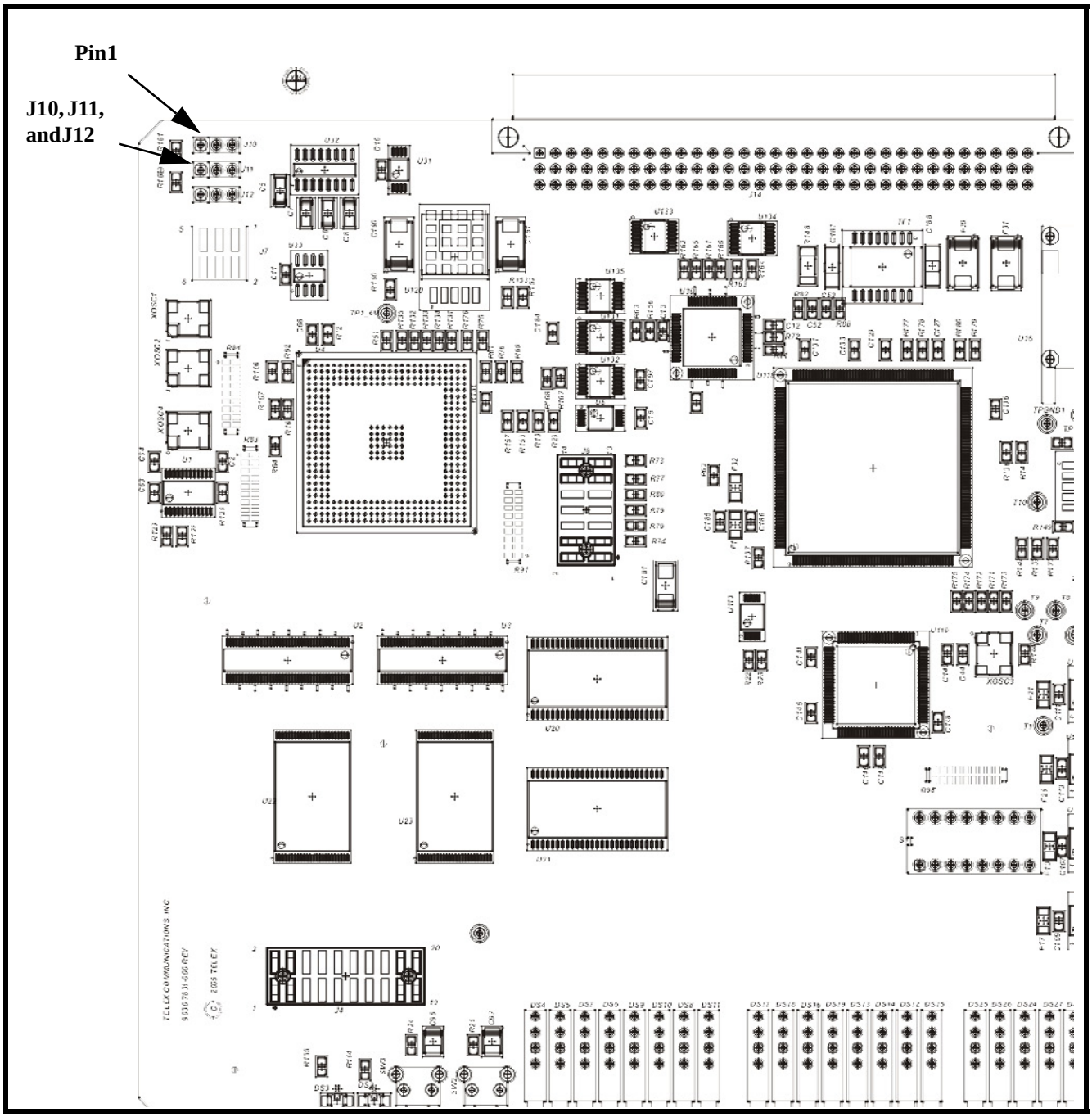


FIGURE 44. Frontcard - RVON-C 9030-7835-000

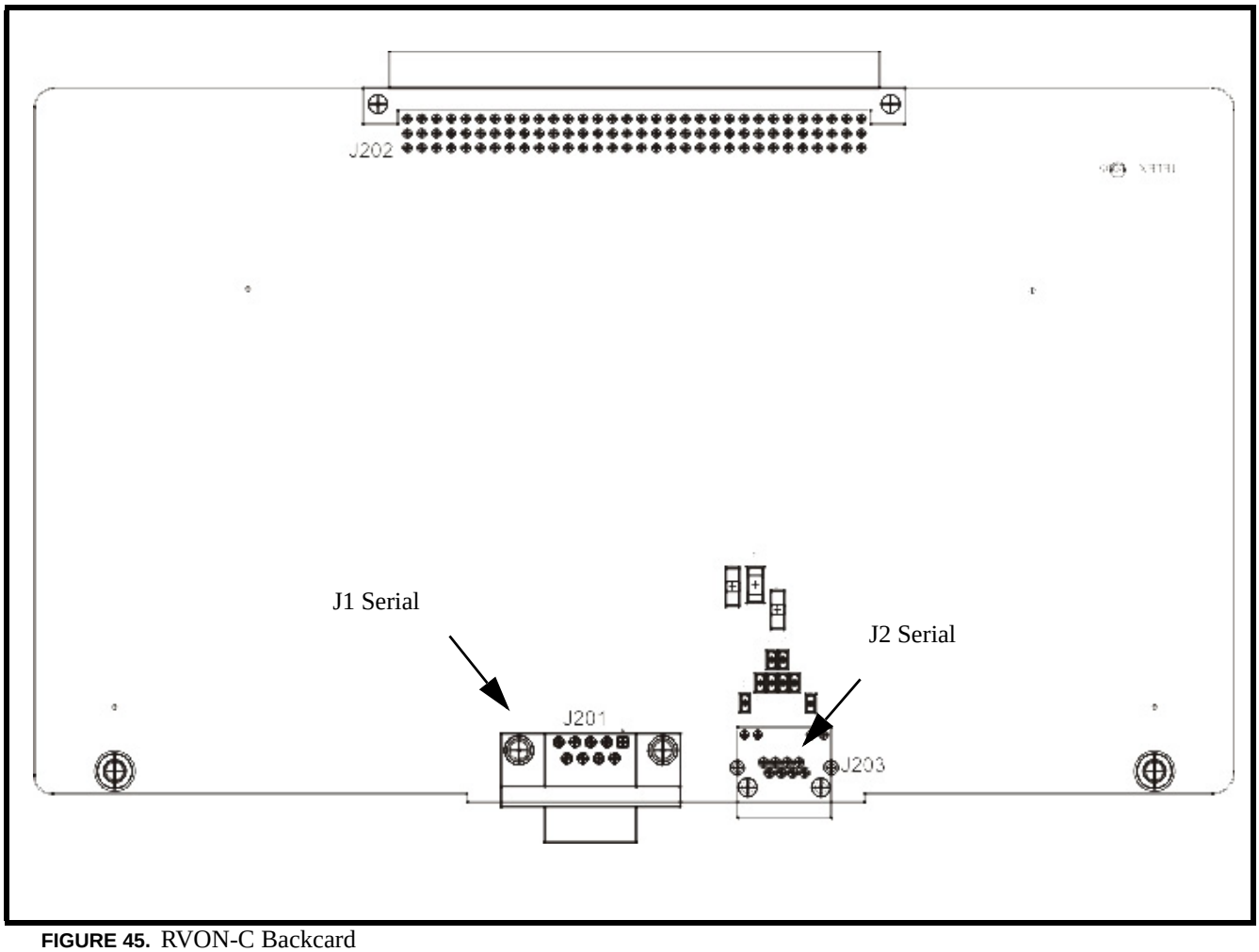


FIGURE 45. RVON-C Backcard

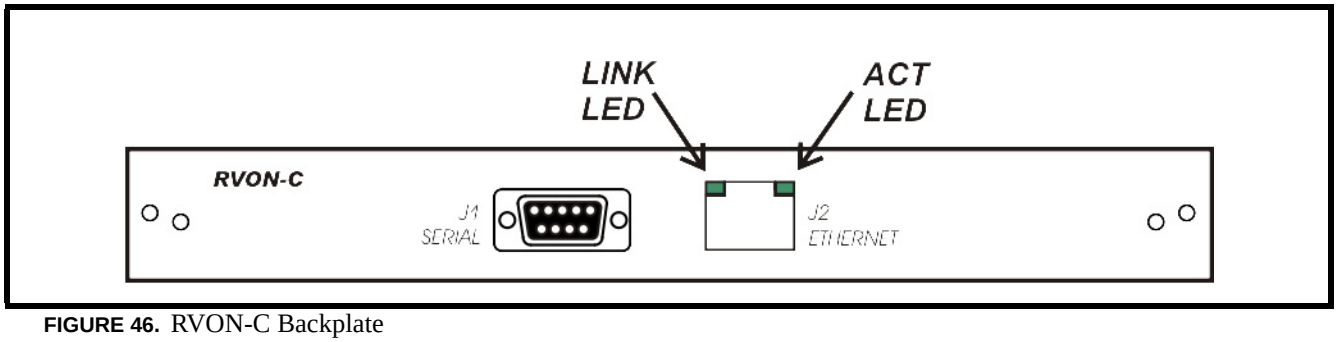


FIGURE 46. RVON-C Backplate

Installation of the RVON-C Card into the Cronus System

When inserting the RVON-C card into the Cronus system, the following considerations must be made:

- Gently insert the RVON-C card into the correct slot. If the card is forced or twisted while inserting, a pin on the backplane could short or break causing the card to become inoperable.
- When inserting the RVON-C card into the Cronus system, make sure to insert it into a compatible backcard. If the card is inserted into a incompatible backcard, undesirable results can occur.

Addresses and the RVON-C Card

Because the RVON-C has an Ethernet interface, it is required to have a MAC (Media Access Control) address. This is a low level address that contains 48 bits. Do not confuse this address with an IP (Internet Protocol) Address. In order to be IP compliant, all cards must have a unique MAC ID when shipped from the manufacturer. Typically, the MAC ID of a piece of hardware, such as the RVON -C card, has a fixed or static address. Whereas, the RVON-C card's IP Address can change over time.

The MAC Address uniquely identifies each node of a network and interfaces directly with the network media. The RVON-C card has a small 8-pin serial device on the board so that the processor can read the unique MAC Address. For more information on MAC IDs, contact technical support.

Software Requirements

AZedit.....version 3.1 or higher

RVON-I/O .....version 1.1.0 or higher

RVON-1.....version 1.2.0 or higher

RVON-8.....version 1.2.2 or higher

VKP .....version 1.1.0 or higher

Master Controller .....version 1.3.0 or higher

NOTE: For improved performance, we recommend using a router switch that supports High Priority Packets. For more information on High Priority Packet Router Switches, consult your System Administrator.

IMPORTANT: You must remove the card from the frame in order to change any DIP switch settings on the front card, see Figure 47 on page 43.

DIP Switch 1 **Closed**: Configuration via AZedit is disabled.

Open: (Default) Configuration via AZedit is enabled

Description: Disables the configuration changes via AZedit. AZedit will still be able to view the card configuration and connection status. The configuration can still be changed via the serial and Telnet connections.

DIP Switches 2-4 **Unused - Keep in Open Position**

DIP Switch 5 **Closed**: Reset the Telnet user and passwords to their default value

User: telex

Password: password

Open: (Default) Uses the current user-name and password to their default values.

Description: Enables the user to reset the Telnet User-name and Password

DIP Switch 6 **Closed**: Enables a serial monitor on the backcard DB9 (J2).

Open: (Default) Enables pass-through serial port via the backcard DB9 (J2)

Description: Selects DB9 (J2) serial configuration.

DIP Switch 7 Closed: Runs the Boot Download.

Open: (Default) Runs the native flash program.

Description: Switch to the boot download flash program. This program is sent with the RVON-C card in case the native flash program becomes corrupt.

DIP Switch 8 **DEBUG ONLY!**

WARNING: DIP Switch 8 should always be left in the OFF position. It is reserved for debugging and can have intended consequences.

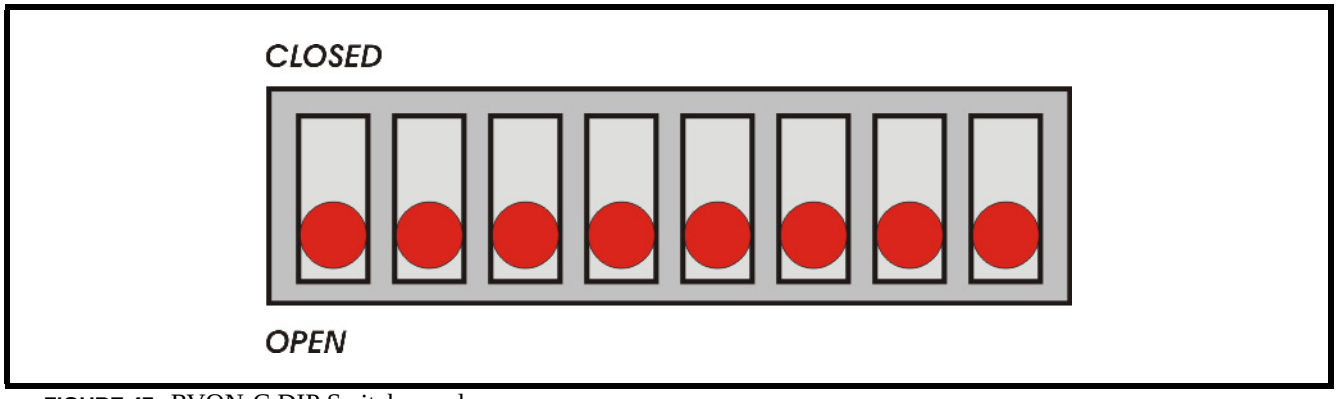


FIGURE 47. RVON-C DIP Switch panel

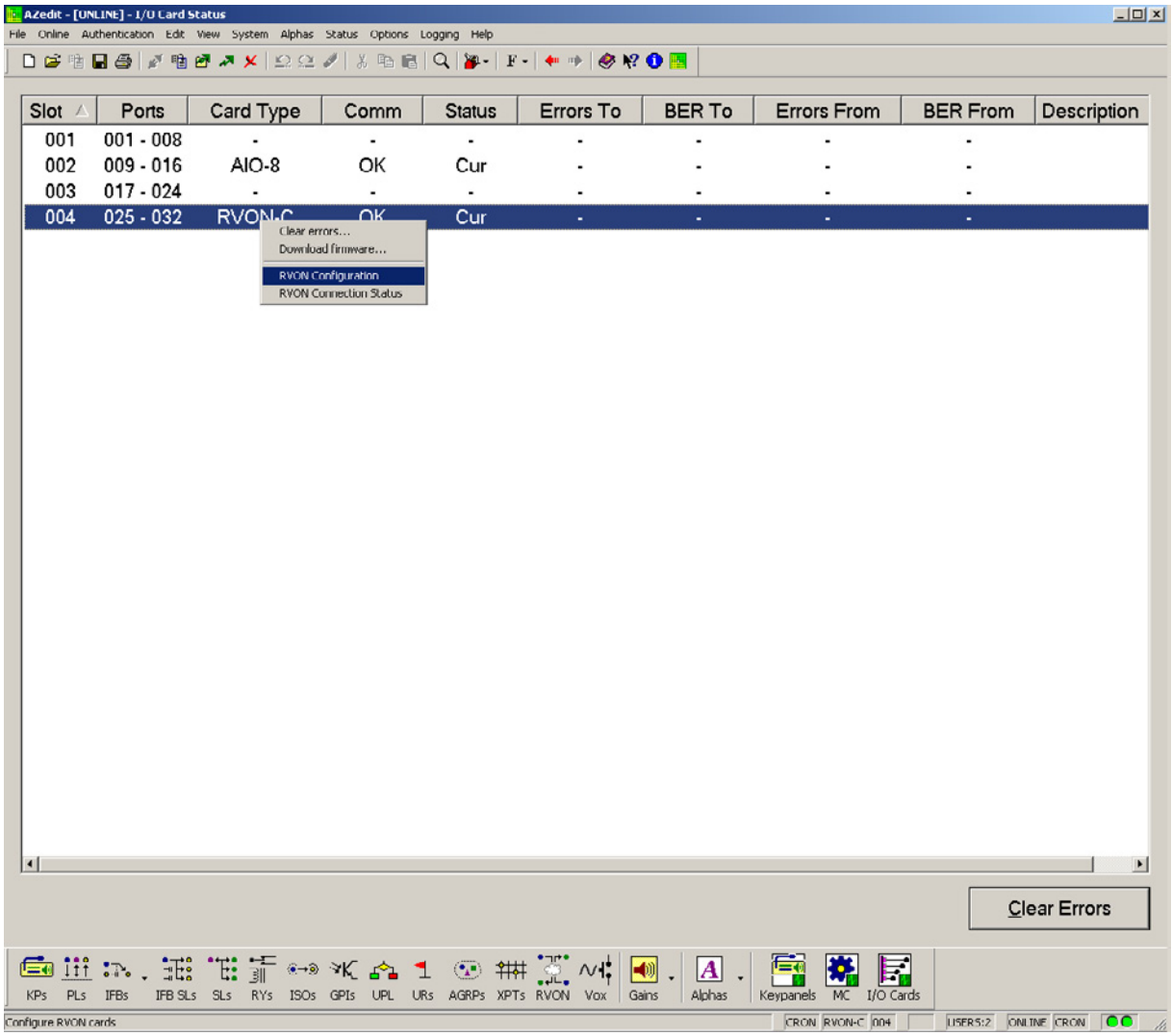
Configuring the RVON-C Card with AZedit

Once the RVON-C card is inserted into the Intercom, AZedit will automatically recognize the card.

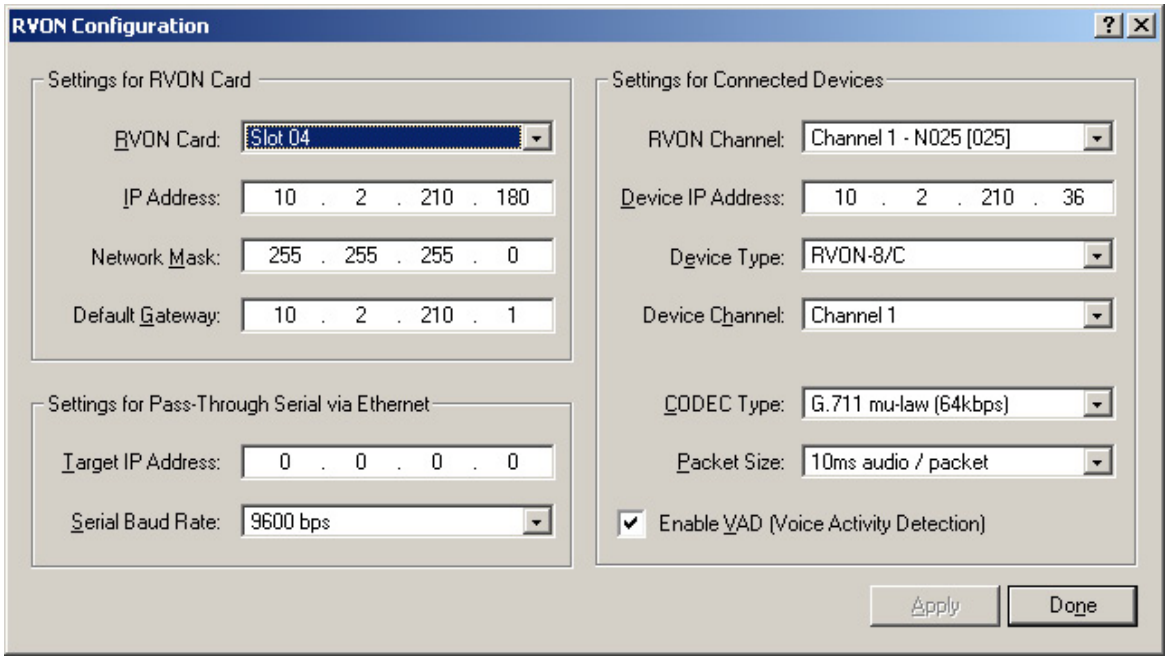
NOTE: Requires intercom firmware and AZedit software that support RVON cards.

To **configure the RVON-C card**, do the following:

1. From the Status menu, select **I/O cards**.
   The I/O Card Status screen appears showing the types of installed cards.


AZedit - [UNLINE] - I/O Card Status
File Online Authentication Edit View System Alphas Status Options Logging Help
Slot Ports Card Type Comm Status Errors To BER To Errors From BER From Description
001 001 - 008 - - - - - - -
002 009 - 016 AIO-8 OK Cur - - - -
003 017 - 024 - - - - - - -
004 025 - 032 RVON-C OK Cur - - - -
Clear errors...
Download firmware...
RVON Configuration
RVON Connection Status
Clear Errors
KPs PLs IFBs IFB SLs SLs RYs ISOs GPIs UPL URs AGRPs XPTs RVON Vox Gains Alphas Keypanels MC I/O Cards
Configure RVON cards
CRON RVON-C 004 USER5:2 ONLINE CRON

2. Right-click on an **RVON-C card,** and select **RVON-C Configuration**.
   The RVON-C Configuration screen appears.


RVON Configuration
Settings for RVON Card
RVON Card: Slot 04
IP Address: 10 . 2 . 210 . 180
Network Mask: 255 . 255 . 255 . 0
Default Gateway: 10 . 2 . 210 . 1
Settings for Pass-Through Serial via Ethernet
Target IP Address: 0 . 0 . 0 . 0
Serial Baud Rate: 9600 bps
Settings for Connected Devices
RVON Channel: Channel 1 - N025 [025]
Device IP Address: 10 . 2 . 210 . 36
Device Type: RVON-8/C
Device Channel: Channel 1
CODEC Type: G.711 mu-law (64kbps)
Packet Size: 10ms audio / packet
Enable VAD (Voice Activity Detection)
Apply
Done

3. From the RVON-C drop down list, select the **slot** in which the RVON-C card resides, if it is not already selected.
4. In the IP Address field, enter the **IP Address** you have assigned to the RVON-C card.
5. In the Network Mask field, enter the **Network Mask** to which the RVON-C card is connected.
6. In the Default Gateway field, enter the **Default Gateway Address** (if applicable) of the network to which the RVON-C card is connected.
   A Default Gateway is only required if the RVON-C connections are between LANs.

Under Settings for Pass-Through Serial via Ethernet

7. In the Target IP Address field, enter the **target IP Address** of the device you want to connect to over Ethernet.
8. From the Serial Baud Rate drop down list, select the **baud rate** at which the data is transmitted.

Under Settings for Connected Devices

NOTE: You MUST configure the channel settings on each end of a connection and ensure the same codec and packet size are selected at each end. Remember, the RVON-C card has different channels which can be configured.

9. In the RVON-C Channel drop down list, select the **channel** you want to use to communicate to another device across the network.
10. In the Device IP Address field, enter the **IP Address** of the device to which you want to connect.
11. From the Device Type drop down list, select the **type** of device to which the RVON-C card is connecting.
12. From the Device Channel drop down list, select the **channel** on the device to which the RVON-C card will communicate.
13. From the CODEC Type drop down list, select the **CODEC type** you want to use for this channel.
14. From the Packet Size drop down list, select the **size** of each audio packet.

NOTE: A CODEC is an algorithm used to compress audio. There are 5 Codices support by Telex: G.711µs law, G.711A law, G.729AB, G.723 (5.3k) and G.723 (6.3k). The type of CODEC will dictate the quality of audio you hear and the network bandwidth used. The packet size determines how much audio data is carried across the network in each transmitted packet. The CODEC type and pack size chosen require different amounts of bandwidth from the network (See “Specifications” on page 38.). As with CODEC type, the packet size you choose for the audio transfer will affect the audio you hear and the bandwidth you use over the network. The larger the audio packet you choose to use, the lower the bandwidth used. However, the larger packet size can result in a higher delay and longer gaps if the packet is lost. On the other hand, the smaller packet sizes result in larger bandwidth use, but lower delays and smaller gaps if the packet is lost. The Intercom System Engineer and the Network Administrator may want to work together in choosing the CODEC type and packet size suitable for the size of the network, so degradation of network resources does not happen.

15. Select **Enable VAD**, if you want to conserve bandwidth when the audio level is below a given threshold.

NOTE: **VAD** (Voice Activity Detection) saves network bandwidth by stopping the flow of audio packets when silence is detected. VAD is similar to VOX.

At this point you may choose another channel to configure or choose another card to configure.

16. Once you are completely finished, click **Apply**.
Apply sends all of the changes to all the cards in the intercom, or click Cancel to discard all changes you made.

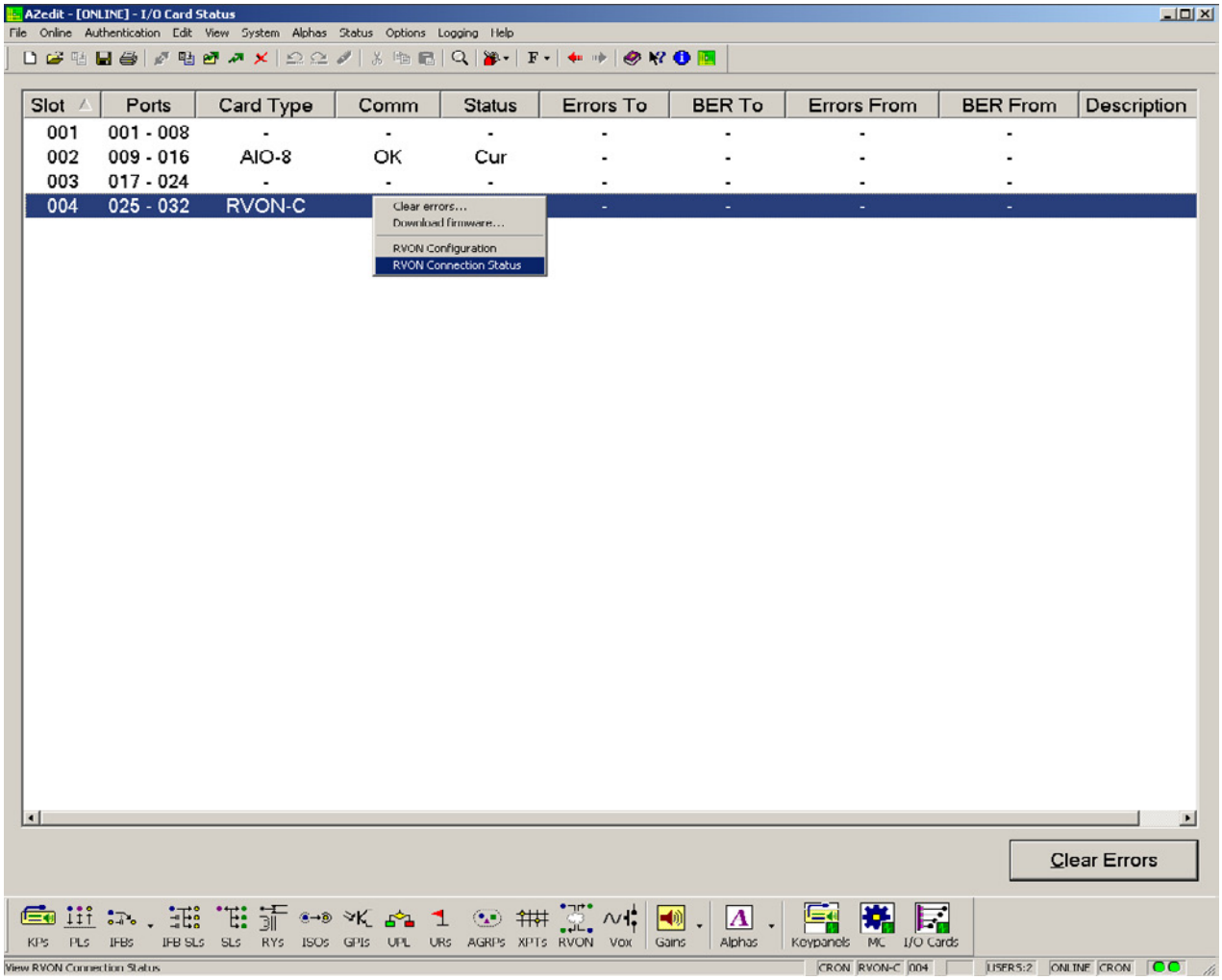
RVON-C Connection Status Screen

The RVON-C Connection Status screens display information pertaining to RVON-C channel connections. You can only show statistics for one channel on a card at a time.

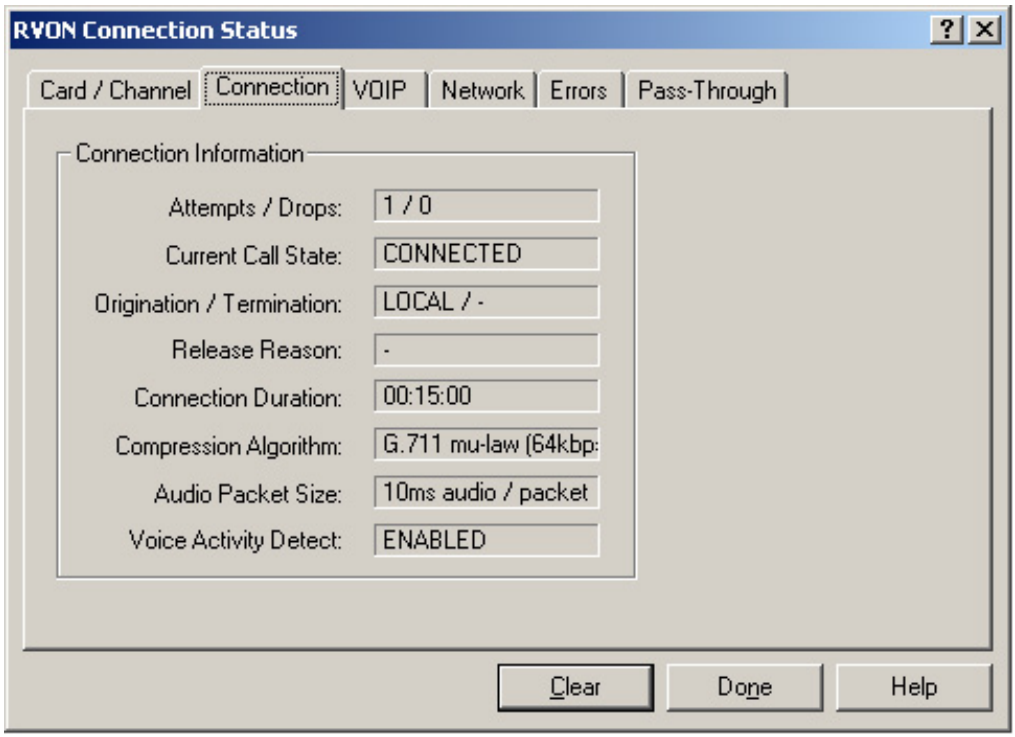
NOTE: To view the RVON-C Connection Status screens make sure both AZedit and the RVON-C card are on the same Ethernet network. The reason this is important is because the statistics are updated once per second. At this rate of dynamic update, a serial port could not pass this much data effectively.

To **get to the RVON Connection Status screen**, do the following:

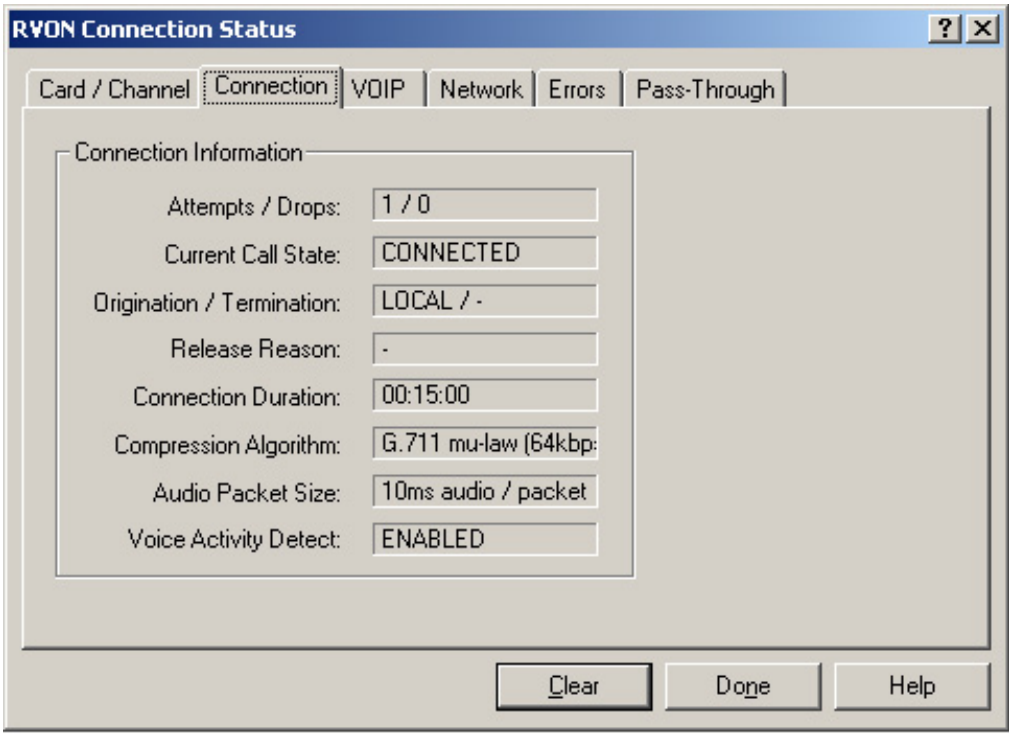
1. From the Status menu, select **I/O Cards**.
   The I/O Card Status screen appears showing the types of installed cards.


AZedit - [ONLINE] - I/O Card Status
File Online Authentication Edit View System Alphas Status Options Logging Help
Slot Ports Card Type Comm Status Errors To BER To Errors From BER From Description
001 001 - 008 - - - - - - -
002 009 - 016 AIO-8 OK Cur - - - -
003 017 - 024 - - - - - - -
004 025 - 032 RVON-C - - - -
Clear errors...
Download firmware...
RVON Configuration
RVON Connection Status
Clear Errors
KPs PLs IFBs IFB SLs SLs RYs ISOs GPIs UFL URs AGRIPs XPTs RVON Vox Gains Alphas Keypanels MC I/O Cards
View RVON Connection Status
CRON RVON-C 004 USERS:2 ONLINE CRON

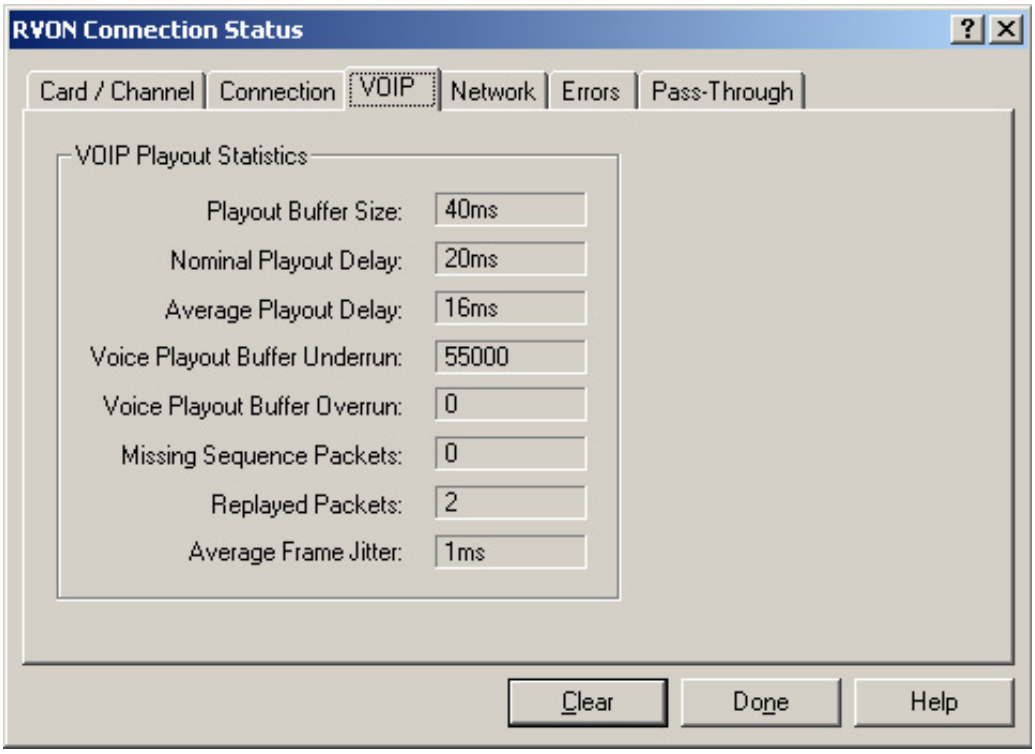
2. Right-click the **card** with which you want to work.
   A context menu appears.
3. Select **RVON Connection Status**.
   The RVON Connection Status screen appears. The Connection Status screen contains six pages of information about the selected channel and are described in detail on the following pages.



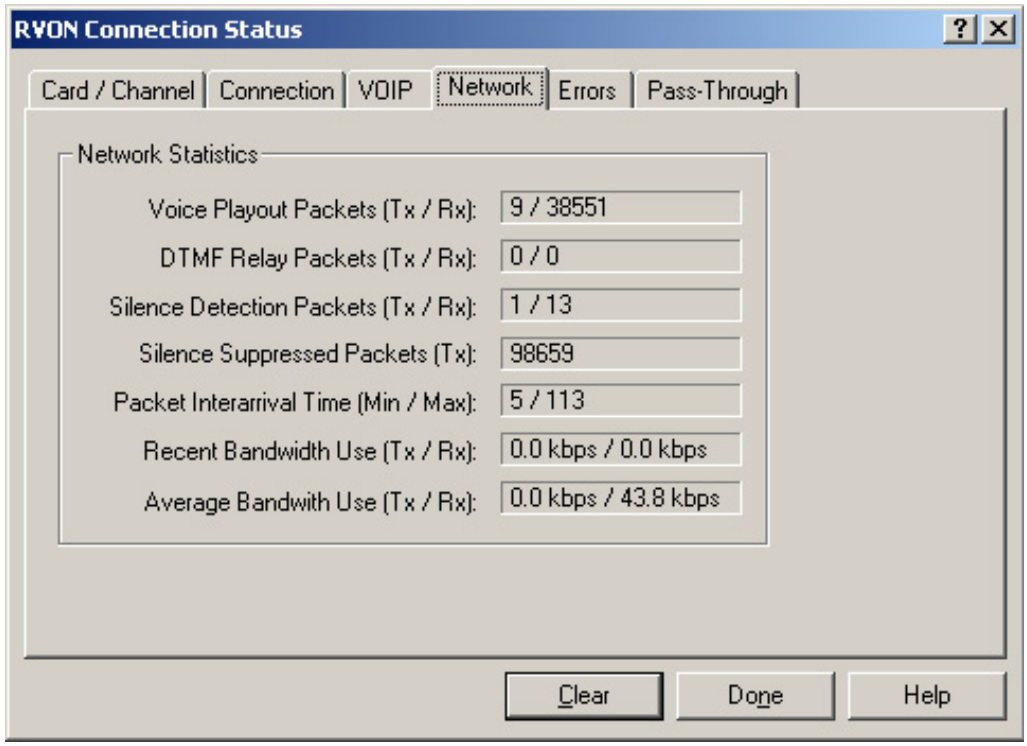
Screen Item	Description
Select Local Card and Channel	
RVON Card	The card for which you want to view the status. 1. From the RVON drop down list, select the **card** you want to view.
IP Address	Displays the IP (Internet Protocol) Address of the card you select
Local Channel	One of eight audio channels supported by the RVON-C card. 1. From the Channel drop down list, select the **channel** for which you want to view the status.
Remote Connection Information	
Device Type	Displays the type of device the RVON-C card is connected at the other end of the channel.
IP Address	Displays the IP Address of the device connected at the other end of the channel.
Remote Channel	Displays the channel at the other end of the connection that the device is using.



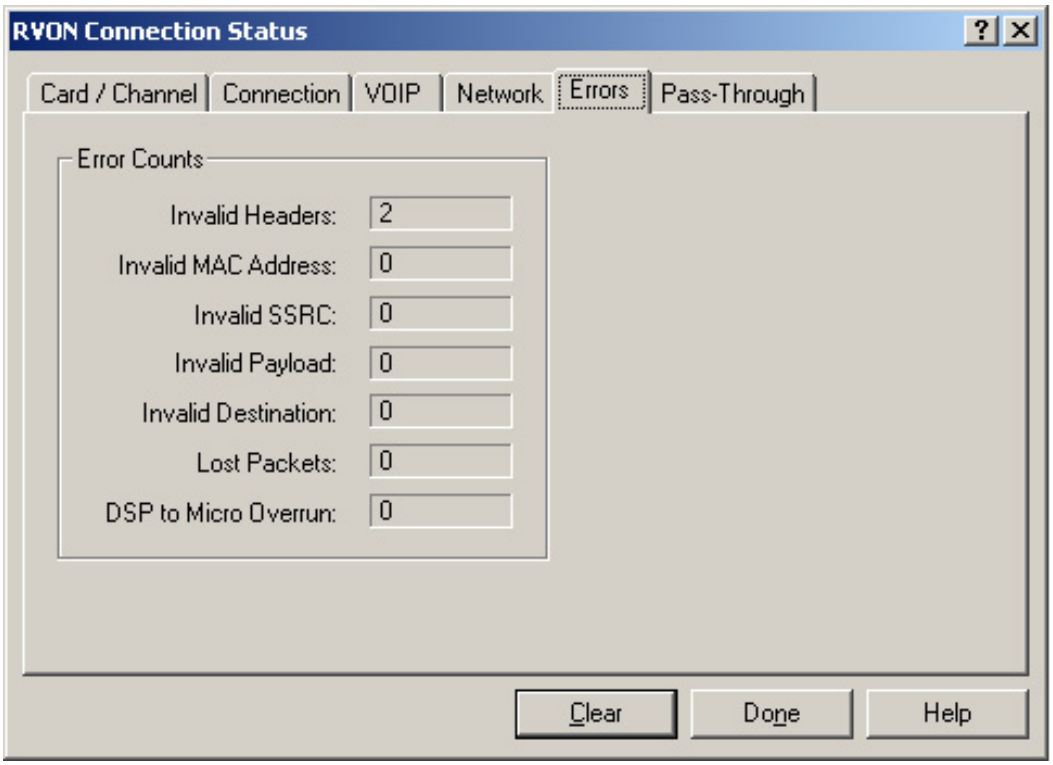
Screen Item	Description
Attempts / Drops	The number of times a call attempt has been made and dropped. **NOTE:** The number of attempts should always be one greater than the number of drops.
Current Call State	Displays the state of connection. There are two connection states: Connected or Idle.
Origination / Termination	Displays which end of the connection originated or terminated the call. Local: RVON-C Card Remote: Device at the other end of the connection
Release Reason	Displays why the connection was terminated, for example congestion, network error, local release, or remote release.
Connection Duration	Displays the duration of the connection. This is shown in hh/mm/ss.
Compression Algorithm	Displays what type of configuration the connection is using. This can be different than the original configuration if both ends of the channel are not configured the same. If the configuration is different, these fields will be in red.
Audio Packet Size	
Voice Activity Detect (VAD)	



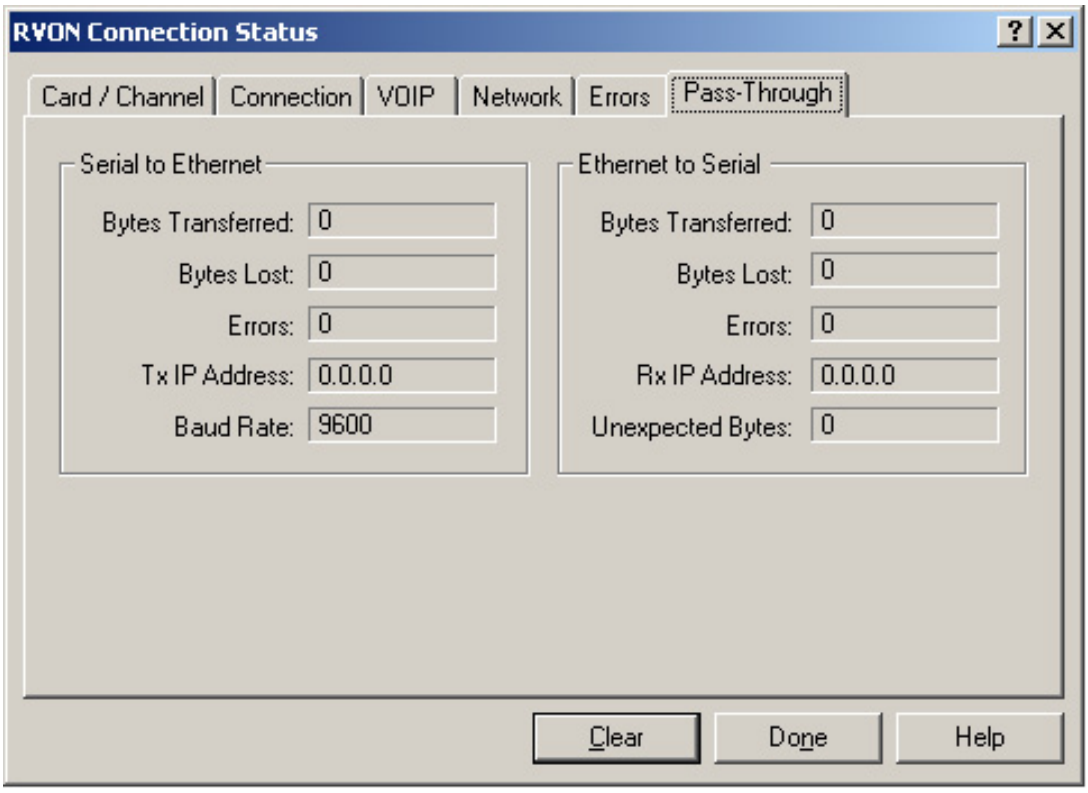
Screen Item	Description
	VoIP Playout Statistics
Playout Buffer Size	Displays how much audio can be received from the network before packets are lost. This is four times bigger than configured packet size. This is a static system setting.
Nominal Playout Delay	Displays how much audio is collected before playout begins. Playout begins at half the Playout Buffer size, which is two times the configured packet size. This is a static system setting.
Average Playout Delay	Displays the actual average audio collected before packets are played out. This is measured over the length of the connection.
Voice Playout Buffer Underrun	Displays the number of packet times that packets were not played because the Playout Buffer was empty. **NOTE:** If VAD is enabled, there will be playout buffer runs because there are no packets being received during silence.
Voice Playout Buffer Overrun	Displays the number of packets that were discarded because the Playout Buffer was full.
Missing Sequence Packet	Displays how many audio packets were missed in the sequence.
Replayed Packets	Displays how many audio packets were replayed.
Average Frame Jitter	Displays the measure of consistency of packet arrival times. Lower jitter is better.



Screen Item	Description
	Network Statistics
Voice Playout Packets (Tx/Rx)	Displays the number of voice packets transmitted and received from the other side of the connection.
DTMF Relay Packets (Tx/Rx)	Displays the number of DTMF (dual tone multiple frequency) relay packets transmitted and received. DTMF relay packets are a bandwidth and quality saving feature within the RVON-C card.
Silence Detection Packets (Tx/Rx)	Displays the number of times a silence detection packet has been sent or received. VAD (voice activity detection) must be enabled.
Silence Suppressed Packets (Tx)	Displays the number of packets never sent because the packets contained silence.
Packet Interval Time (min/max)	Displays the minimum and maximum time elapsed between packets being sent.
Recent Bandwidth Use (Tx/Rx)	Displays the amount of bandwidth used in Kbytes/sec over the length of the call. This is calculated by the number of voice packets transmitted and received over the last 10 calls.
Average Bandwidth Use (Tx/Rx)	Displays the amount of bandwidth used in Kbytes/sec over the length of the call. This is calculated by the number of voice packets transmitted and received and the length of the connection.



Screen Item	Description
	Error Counts
Invalid Headers	Displays how many IP packets could not be parsed.
Invalid MAC Address	Displays how many invalid MAC addresses tried to connect.
Invalid SSRC	Displays the number of packets with an invalid SSRC.
Invalid Payload	Displays how many incorrectly formatted packets were received.
DSP to Micro Overrun	Displays the number of packets that were lost because the Micro was too busy to receive.
Invalid Destination	Displays how many invalid destinations were received.
Lost Packets	Displays how many packets were lost.



Screen Items	Description
SERIAL TO ETHERNET	The Serial to Ethernet information shows the serial data that is received on the serial connection and transferred to the Ethernet address of the card to which the serial data is sent.
Bytes Transferred	Displays the number of bytes transferred from the serial connection to Ethernet.
Bytes Lost	Displays the number of bytes that could not be transferred.
Errors	Displays the number of errors that occurred during transfer.
Tx IP Address	Displays the IP address of the card the serial data is sent.
Baud Rate	Displays the baud rate of the serial connection.
ETHERNET TO SERIAL	The Ethernet to Serial information shows the serial data that is received on the Ethernet connection and transferred to the serial connection.
Bytes Transferred	Displays the number of bytes that have been transferred to the serial port.
Bytes Lost	Displays the number of bytes that could not be transferred.
Errors	Displays the number of errors that occurred during transfer.
Rx IP Address	Displays the IP Address from which data was last received via Ethernet (this address should match the Tx IP Address).
Unexpected Bytes	Displays the number of unexpected bytes of data. Unexpected bytes is data that has come from any IP address that is not the Tx IP Address. The bytes of data are considered unexpected bytes and are not transmitted.

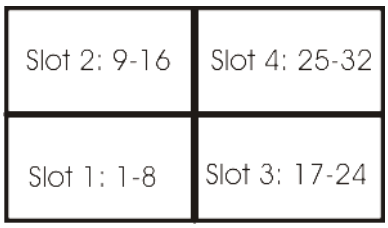
View RVON-C Status from Cronus Front Panel

Not only are you able to view the status of the RVON-C from AZedit, but now you can also view the status of your card from the front panel display on the Cronus system.

To **access RVON-C status from the Cronus front panel**, do the following:

1. On the front of the Cronus, tap either of the **selector knobs**.
   The top-level menu appears.
2. Turn either selector knob to display **Status**.
3. Tap the **selector knob**.
   The Status sub-menu appears.
4. Turn either selector knob to display **RVON-C**.
5. Tap the **selector knob**.
   Slots Available appears.

   NOTE: There are four slots maximum in each Cronus for RVON-C cards. Each RVON-C card has 8 channels of audio IN and OUT. Slots that are connected to an RVON-C card will have an arrow in the front panel display, otherwise a dot will appear next to the slot.



   If you have more than one Cronus linked together, the slots will continue numbering slot 5, slot 6, and so on.

6. Turn the **selector knob** to select the desired slot.
7. Tap the **selector knob**.
   Ethernet Status, Serial Status, and VoIP Channel Status appears. See "RVON-C Status Descriptions" on page 55. for description of each status.
8. Turn the **selector knob** to the desired status.
9. Tap the **selector knob**.

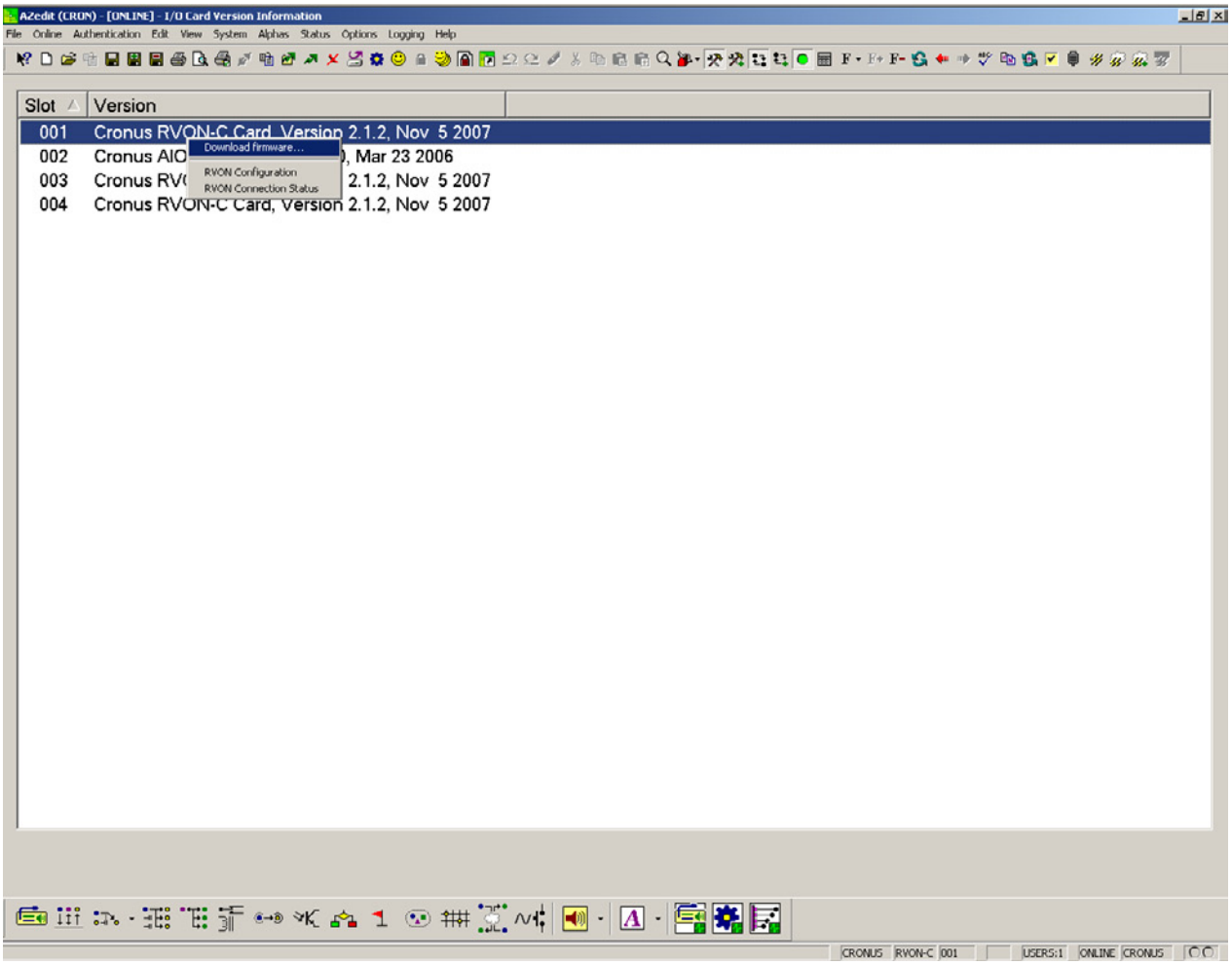
TABLE 2. RVON-C Status Descriptions

ACTION	DISPLAY
When Ethernet is selected:	
	Link Up - Displays whether the Ethernet link is active or inactive. **Link Up**=Active, **Link Down**=Inactive **Speed** - Displays the connection speed in mbps. Can be either 10mbps or 100mbps. **Mode** - Displays whether the connection is Half Duplex (data that moves in one direction) or Full Duplex (data that moves in both directions). **Auto-Negotiate** - Automatically determines the Ethernet speed and mode, and then adjusts the settings accordingly.
When Serial is selected:	
	IP - Displays the IP Address of where the transfer is being sent. **Baud** - Displays the connection speed of the RVON-C. **To Net** - Displays the number of bytes that have been transferred from the serial port. **To Ser** - Displays the number of bytes that have been transferred to the serial port.
When VoIP Channel is selected:	
	VoIP..... - displays the channel connection status to other RVON devices. The channel connection shows connections to RVON-8, RVON-I/O, RVON-1, RVON-C, and VKP. Each dot (or checkmark) represents a channel connection. There are eight channel connections for each RVON-C card. If a dot (•) is seen in the display, this means that the channel is not connected to a RVON device. If a checkmark (✔) is seen in the display, this means that the channel is connected to an RVON device.
	Panels..... - displays whether or not there is a keypanel connected at the other end of the channel connections. Each dot (or checkmark) represents a channel connection. There are eight channel connections for each RVON-C card. If a dot (•) is seen in the display, this means that the channel is not connected to a keypanel. If a checkmark (✔) is seen in the display, this means that the channel is connected to a keypanel.
	NOTE: Channels are ordered from left to right.

Download RVON-C Firmware through AZedit

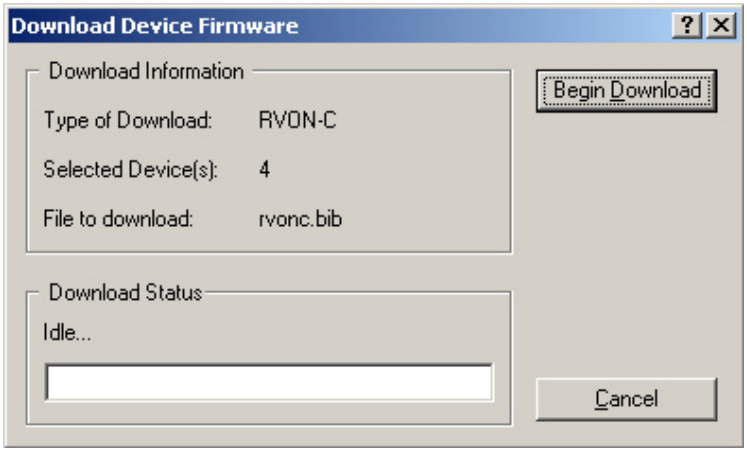
NOTE: AZedit sends the program directly to the RVON-C card over Ethernet. This is different from other I/O cards that receive the firmware from the Master Controller. For this reason, verify the PC running AZedit is on the same network as the RVON-C card. If it is not, AZedit will not be able to find the RVON-C card. To test the connection, ping the RVON-C card from a command line. For more information on testing for a connection, see See “Basic Network Configuration” on page 59..

1. Open **AZedit**.
2. From the Status menu, select **Software Versions**, and then **I/O Cards**.
   The I/O Card Version Information screen appears showing the occupied slots in the system.

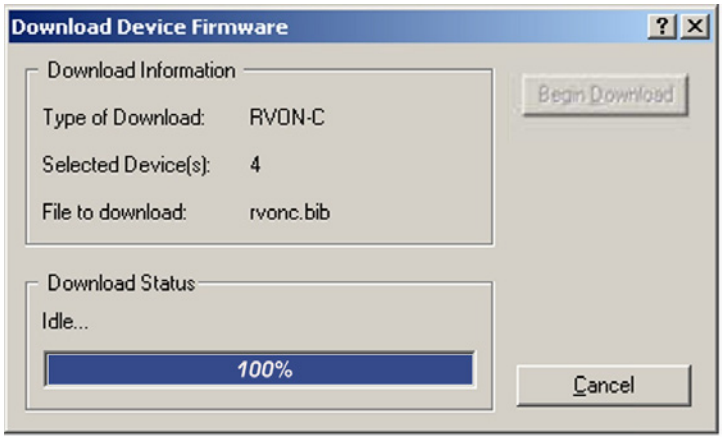

AZedit (CRON) - [ONLINE] - I/O Card Version Information
File Online Authentication Edit View System Alphas Status Options Logging Help
Slot
Version
001 Cronus RVON-C Card, Version 2.1.2, Nov 5 2007
002 Cronus AIO , Mar 23 2006
003 Cronus RV 2.1.2, Nov 5 2007
004 Cronus RVON-C Card, Version 2.1.2, Nov 5 2007
Download firmware...
RVON Configuration
RVON Connection Status
CRONUS RVON-C 001 USERS:1 ONLINE CRONUS

3. Highlight the **Version** to be updated.
   You may select more than one version at a time by holding the CTRL key down while you select.
4. Right-click the **highlighted selections** and select **Download Firmware**.
   The Firmware Download window appears.
5. Using the browse feature, browse to the **file to be downloaded**.

6. Click **Open**.
   The Download Device Firmware window appears.



7. Click **Begin Download**.
   The download begins.



8. Click **OK**.
   The RVON-C firmware download is complete. This may take a minute or two to occur.
9. Verify the version upgrade in the I/O Card Version Information Window is correct.

WARNING: Do **NOT** reset the Master Controller. Do **NOT** power down the frame or pull the RVON-C card(s) from the frame until you have verified the new version information from AZedit. If the card loses power while reprogramming the on-board flash memory, the card may need to be returned to the Lincoln service department.

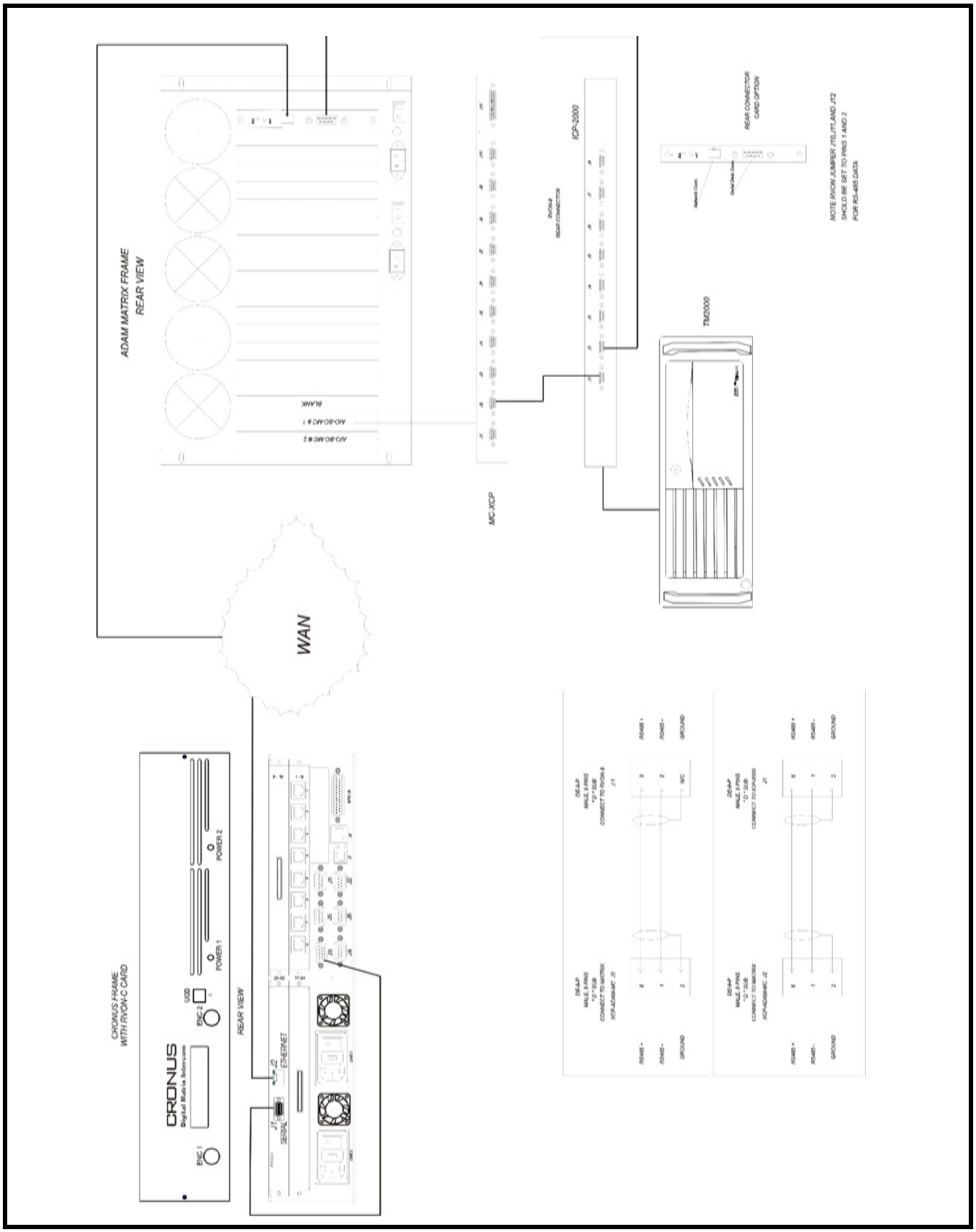


FIGURE 48. RVON-C System Diagram

Basic Network Configuration

Basic Network Configuration

This section covers basic network configuration set-up and testing. Also covered are basic concepts and operations, including the difference between LAN and WAN networks and how IP Addressing is used.

In a networked environment, such as a company, typically there are many computers connected together using a **router** or a **switch**. In larger companies, there may be several different routers distributed in buildings and plant locations. A router allows any LAN-side computer to communicate with other computers and devices outside the LAN (local area network). Routers send data packets from one place to another place on a network. routers use network addresses to route packets to the correct destination. For example, in a TCP/IP network, the IP (internet protocol) address of the network interface is used to direct router destinations.

Because routers help computers inside the LAN "talk" with computers outside of the LAN, the security of a company's LAN may be compromised by gaps of open ports in the router. Security measures may have been instituted to compensate for these vulnerabilities. Consult you network administrator to learn about the security measures taken to protect your network. **VPN**, or virtual private network, is one such security measure to protect the intelligence of the LAN. A computer outside the LAN must have an address or key known by the VPN to allow access to the LAN. Many companies use a VPN to connect two different LANs, thus allowing the transfer of data between two networks.

LAN (local area network) vs. WAN (wide area network)

LOCAL AREA NETWORK

Simply put, a LAN is a computer network that connects a relatively small area (a single building or group of buildings). Most LANs connect workstations and computers to each other. Each computer (also known as a "node"), has its own processing unit and executes its own programs; however, it can also access data and devices anywhere on the LAN. This means many users can access and share the same information and devices. A good example of a LAN device is a network printer. Most companies cannot afford the budgetary or hardware expense of providing printers for each of its users; therefore, one printer (or device) is placed on the LAN where every user can access the same printer.

The LAN uses IP Addresses to route data to different destinations on the network. An IP Address is a 32-bit numeric address consisting of four numbers separated by periods (for example, 1.160.10.240).

NOTE: For more information on IP Addresses, see you local network administrator.

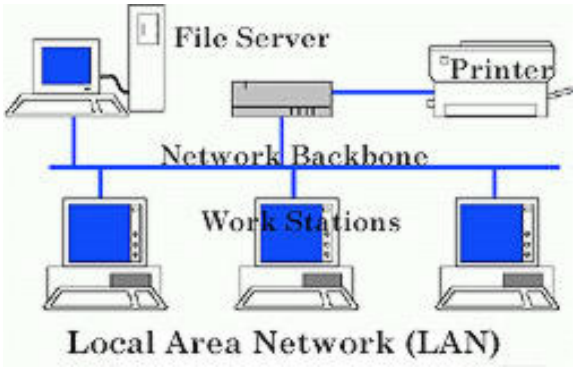


FIGURE 49. Local Area Network Diagram

WIDE AREA NETWORK

A **WAN** (Wide Area Network) connects two or more LANs and can span a relatively large geographical area. For example, Telex Headquarters in Burnsville, MN is connected to several branch offices in Nebraska and Arkansas over a WAN. The WAN in existence is the Internet.

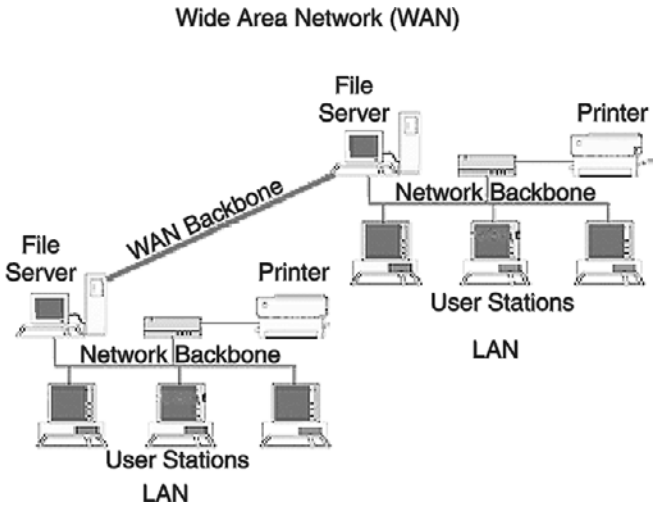


FIGURE 50. Wide Area Network Diagram

ACCESSING THE WIDE AREA NETWORK (WAN)

Figure 13 shows LAN IP Addresses using a common IP Address, 10.2.100.X (192.168.X.X is another common address). Most devices are shipped with these addresses as its default. It is recommended to use these addresses for LANs.

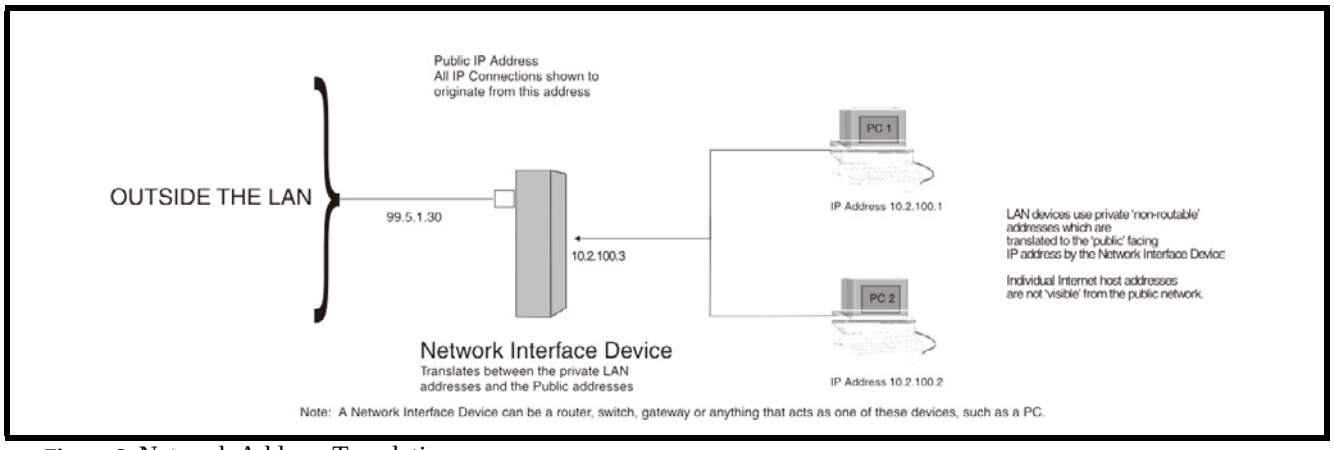

Public IP Address
All IP Connections shown to originate from this address
OUTSIDE THE LAN
99.5.1.30
10.2.100.3
PC 1
IP Address 10.2.100.1
PC 2
IP Address 10.2.100.2
LAN devices use private 'non-routable' addresses which are translated to the 'public' facing IP address by the Network Interface Device
Individual Internet host addresses are not 'visible' from the public network.
Network Interface Device
Translates between the private LAN addresses and the Public addresses
Note: A Network Interface Device can be a router, switch, gateway or anything that acts as one of these devices, such as a PC.

Figure 3. Network Address Translation

NETWORK ADDRESS TRANSLATION (NAT)

Using the initial IP Address, then converting it to a valid WAN IP Address is how the network address translation works, in theory. Once the IP address is changed, it is up to the network interface device (such as a router, gateway, switch, etc.) to keep track of which computers are talking on which ports. For example, if two local devices (PC1 and PC2 in Figure 3) both wanted to talk via port 1031, then the network interface device would have to change one of the port requests to the next available port, 1032.

PORTS

In general, a network port is an endpoint to a logical connection. The port number identifies what type of port it is. For example, port 80 is used for HTTP traffic. When you type an address into the *address bar* of a web browser, your computer goes to find an IP Address for the url you are requesting (http://www.telex.com). To obtain this address, the computer contacts a DNS server (Domain Name Server). Once the IP Address is found, it tries to connect to the http port of the network device (port 80). See Table 1 for a list of the more well-known port numbers.

Each network device can be set-up to respond or not respond to the various ports. The function of responding or “hosting a service” is called “serving”.

TABLE 1. Packet Translation

	Packet before Translation				**Packet after Translation**			
	Source		Destination		Source		Destination	
	IP Address	Port Number	IP Address	Port Number	IP Address	Port Number	IP Address	Port Number
To Internet	10.2.100.2	1031	192.156.136.22	80	99.5.1.30	1031	192.156.136.22	80
From Internet	192.156.136.22	80	99.5.1.30	1031	192.156.136.22	80	10.2.100.2	1031

If a second workstation on the LAN wants to communicate to the same server, and happens to use the same source port number, then the LAN Modem will translate the source port number as well as the source IP address. In Table, 2, a second LAN computer wants to access a web page. The NAT device now uses port 1032 for this connection where it used port 1031 in Table 1.

Table 2. Packet Translation

	Packet before Translation				Packet After Translation			
	Source		Destination		Source		Destination	
	IP Address	Port Number	IP Address	Port Number	IP Address	Port Number	IP Address	Port Number
To Internet	10.2.100.1	1031	192.156.136.22	80	99.5.1.30	1032	192.156.136.22	80
From Internet	192.156.136.22	80	99.5.1.30	1032	192.156.136.22	80	10.2.100.1	1031

Amazingly, all the address translation that occurs takes place automatically in order to make web browsing and other functions easier. This is also a way for large web hosting services to speed up the network by having different devices perform different functions.

Port Number	Description
1	TCP Port Service Multiplexer (TCPMUX)
5	Remote Job Entry (RJE)
7	ECHO
18	Message Send Protocol (MSP)
20	FTP-Data
21	FTP- Control
23	Telnet
25	Simple Mail Transfer Protocol (SMTP)
29	MSG ICP
37	Time
42	Host Name Server (Nameserv)
43	Whols
49	Login Host Protocol (Login)
53	Domain Name Server (DNS)
69	Trivial File Transfer Protocol (TFTP)
70	Gopher Service
79	Finger
80	HTTP
103	X.400 Standard
108	SNA Gateway Access Server
109	POP2
110	POP3
115	Simple File Transfer Protocol
118	SQL Services
119	Newsgroup (NNTP)
137	NetBIOS Name Service
139	NetBIOS Datagram Service
143	Interim Mail Access Protocol (IMAP)

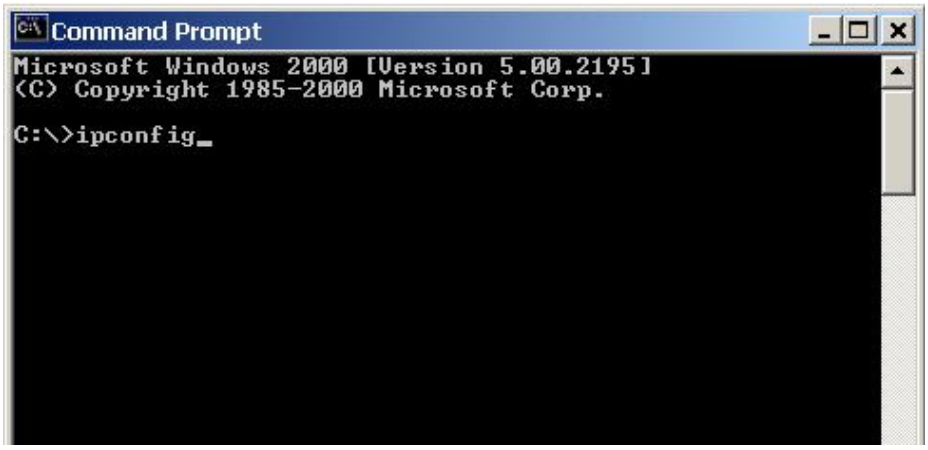
Port Number	Description
150	NetBIOS Session Service
156	SQL Server
161	SNMP
179	Border Gateway Protocol (BGP)
190	Gateway Access Control Protocol (GACP)
194	Internet Relay Chat (IRC)
197	Directory Location Services (DLS)
389	Lightweight Directory Access Protocol (LDAP)
396	Novell Netware over IP
443	HTTPS
444	Simple Network Paging Protocol (SNPP)
445	Microsoft-DS
458	Apple Quick Time
546	DHCP Client
547	DHCP Server
563	SNEWS
569	MSN
1080	Socks

IP ADDRESSES

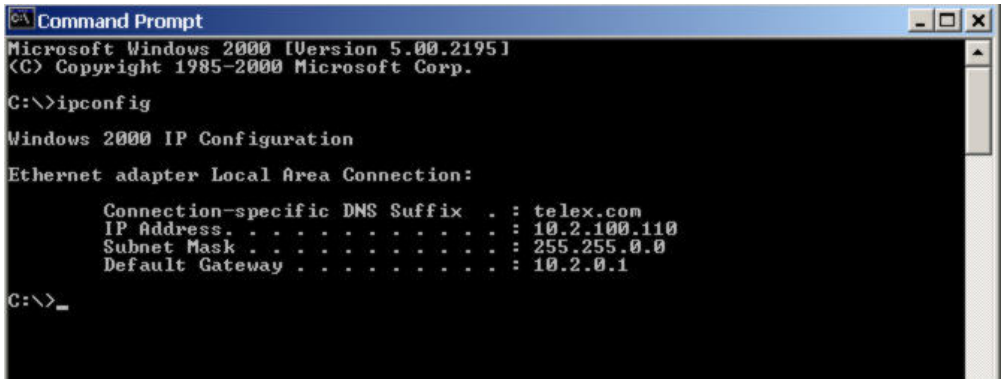
If you do not know your IP Address, you can open a DOS screen in a Windows®- based environment and bring up the ipconfig screen.

To **find your IP Address using ipconfig**, do the following:

1. From the Start Menu, open a **Command Prompt** screen.



2. At the prompt, type **ipconfig**, then press **Enter**.
   The IP configurations appear for your machine, such as the DNS suffix, IP Address, Subnet Mask, and Default Gateway.


Command Prompt
Microsoft Windows 2000 [Version 5.00.2195]
(C) Copyright 1985-2000 Microsoft Corp.
C:\>ipconfig
Windows 2000 IP Configuration
Ethernet adapter Local Area Connection:
Connection-specific DNS Suffix . : telex.com
IP Address. . . . . : 10.2.100.110
Subnet Mask . . . . . : 255.255.0.0
Default Gateway . . . . . : 10.2.0.1
C:\>_

3. At the prompt, type **Exit** to close the screen.

NOTE: If you want more detailed parameters for your machine, type **ipconfig/All**. This screen shows the computers network configuration settings.

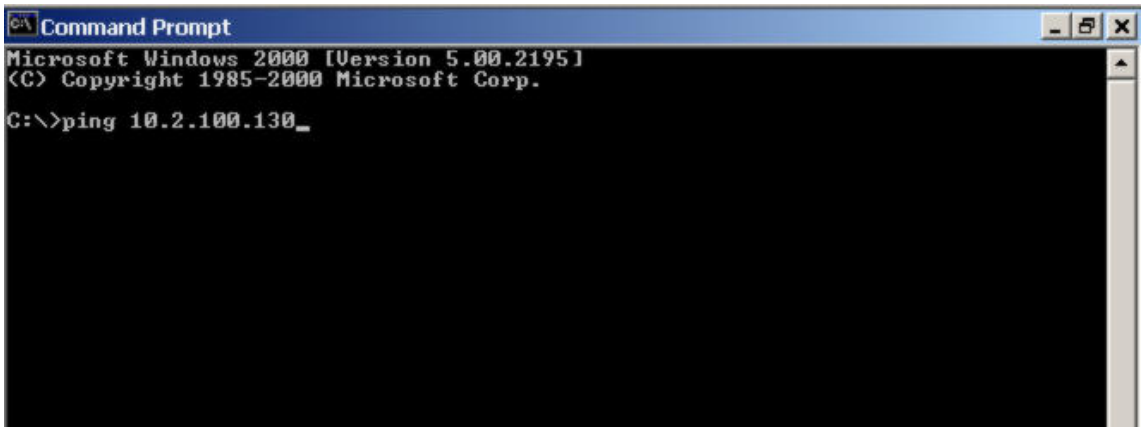
Ping a Computer

Pinging a computer on the network makes sure it is able to be “seen” and receive messages on the network.

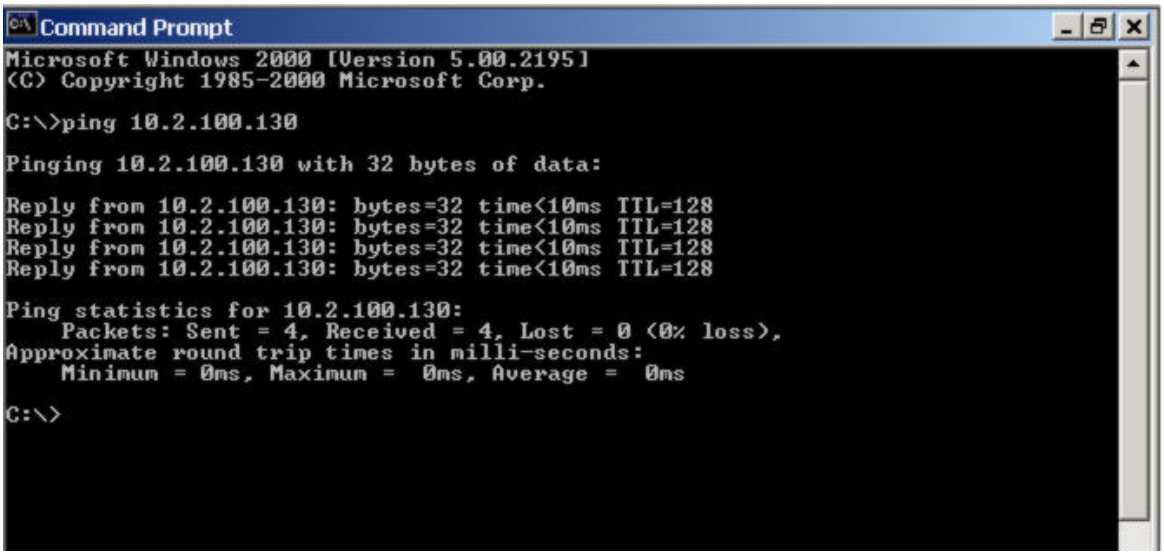
NOTE: You can also ping your RVON-8 card to verify that it is responding over the network by putting the cards IP Address in place of the computer IP Address.

To **ping a computer on the network**, do the following:

1. From the Start Menu, open a **Command Prompt** screen.



2. At the prompt, type the **IP Address** of the computer you wish to ping (for example, 10.2.100.130).
3. Press **Enter**.



NOTE: If the computer you are pinging is not responding to the ping, you will receive a time-out message in the command prompt screen.

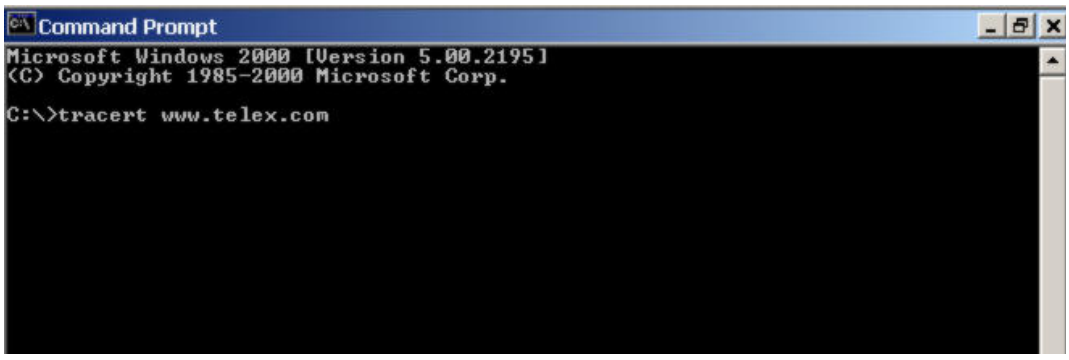
POSSIBLE PITFALL WITH ROUTERS, GATEWAYS, AND SWITCHES

Anytime computers communicate through routers, gateways, and switches, they may be allowed or denied the connection. Network interface devices can be configured to block specific outgoing requests, as well as incoming requests, based on the IP Address and/or port. This is one of the security mechanisms of a router. This also happens when broadcast messages are sent and received.

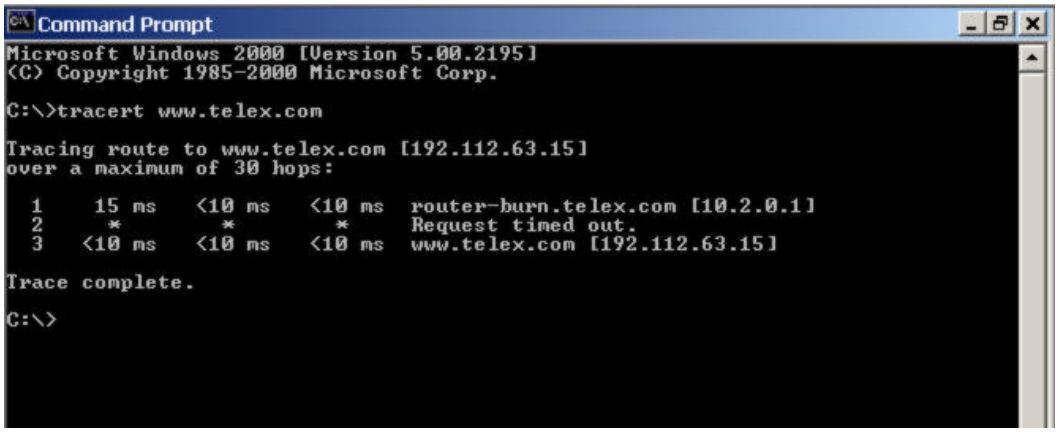
To view the path an IP Address takes to retrieve information, you can execute a tracert from the Command Prompt Screen.

To **run a tracert**, do the following:

1. From the Start Menu, open a **Command Prompt** screen.
2. At the prompt, type **tracert** and type the url or IP Address you want to trace.



3. Press **Enter**.
   The details of the tracer route are displayed.



NOTE: You will the message “request timed out” if the IP Address/ port IN or OUT is denied to the incoming or outgoing message.

4. When you are finished, type **exit** to close the Command Prompt screen.

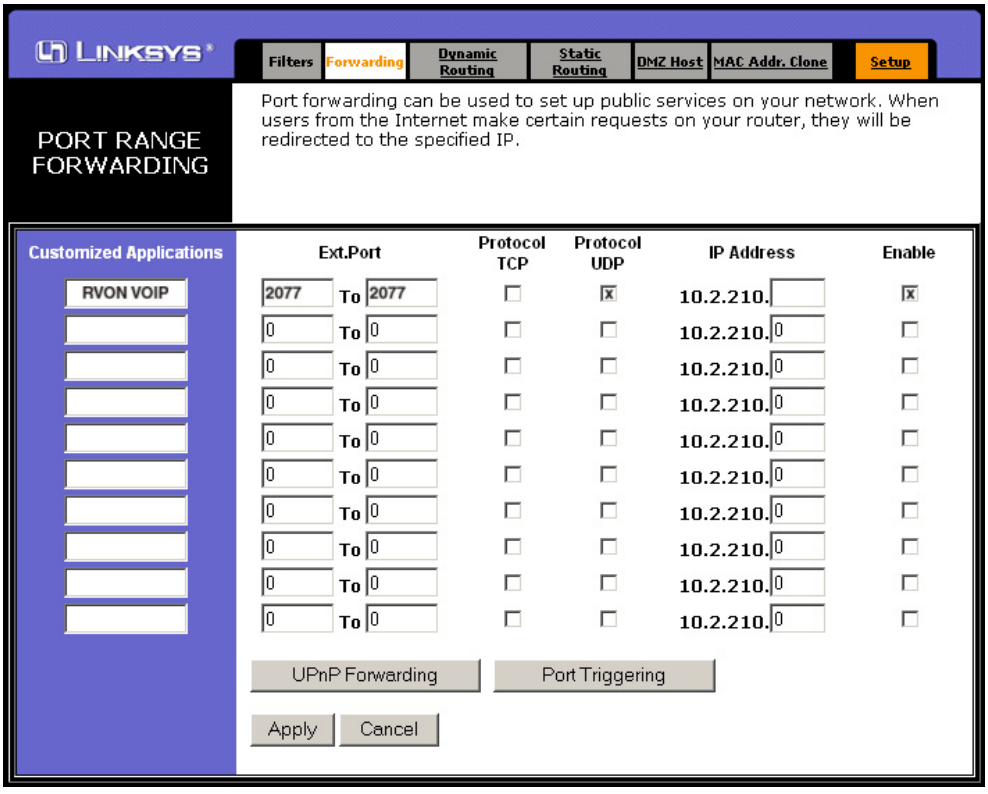
RVON Configuration

RVON cards use ports for communication of audio and control packets. Because routers can be configured to block certain incoming and outgoing requests, you will need to open the following ports in your network to allow WAN connections to and from a Network Interface Device. See the table below for the ports that need to be opened for the RVON cards to operate properly.

Table 3. Ports necessary for RVON card functionality.

Port	Port Description
2076	UDP Call Control Signalling
2077	UDP Audio Packets
2079	UDP Telex Proprietary Signalling
2080	TCP Telex Keypanel Protocol
2081	UDP Pass Through Serial
2082	TCP Firmware Download
2100	Remote Administration
2102	Authentication Server

Below is an example of a router configuration screen. Not all routers are configured the same way and may not look exactly like this screen.



NOTE: Linksys™ supports up to 253 nodes on a router. This is why it is called a Router/Switch because there are WAN functions like a router as well as having a 4-port LAN switch. It also does not support simultaneous forward and DHCP.

Bridges

A **bridge** is a device that connects two LANs, or two segments of the same LAN that use the same protocol. Sometimes called “transparent bridges, they work at the OSI model Layer 2. Simply put, they are not concerned with protocols. Their main job is to pass data to a destination address that is predetermined in the data packet.

With a bridge, all of your computers are on the same network subnet (see Subnet). This means your computers can communicate with each other and have their own Internet connection. If you assign your own IP Addresses be sure to use the same first 3 “octets” of the IP Address (for example, 192.168.0.X).

Domain Name Server (DNS)

A **DNS Server** is an Internet service that translates domain names (for example, in the URL *http://www.telex.com*, the domain name is the telex.com) into IP Addresses. The Internet is based on IP Addresses which are numeric and since domain names are alphabetic, they are easier to remember. Every time a domain name is used it must go through the DNS server to be translated into an IP Address.

Gateway

A **gateway** is a node on a network that serves as an entrance to another network. The gateway routes traffic from a computer to an outside network that is serving the web pages. For example, the gateway for a home computer is the ISP provider that connects the user to the Internet.In a corporate environment, the gateway often acts as a proxy server and a firewall. Gateways are similar to routers and switches in that they forward data to the destination and provide the path for which the data will travel to the destination.

Hub

A **hub** is a common connection point for devices in a network. A hub has multiple ports. When a data packet arrives at a hub, it is copied and distributed to all of its ports so that all nodes on the LAN can see the packets

There are three types of hubs:

passive hub - this hub serves as a conduit for the data, enabling it to go from one device to another.

intelligent hub *(also known as manageable hubs)* - this hub includes addition features that enable administrators to monitor traffic through the hub.

switching hub - this hub reads the destination address of each packet and then forwards the data pack to the appropriate port.

IP Address (Internet Protocol Address)

An **IP Address** is an identifier or numerical name for a computer or device on a network. Data between computers are routed over the network using these addresses to identify the computer the message is being sent to and the computer the message is being sent from.The format of an IP Address is a 32-bit numeric address written as four numbers separated by periods. For example, an IP Address looks like 10.100.1.1.

IMPORTANT: When working within an isolated network (meaning there is no Internet access), IP Addresses can be assigned at random just as long as they are unique to each computer and device. When the isolated network is connected to the Internet, registered Internet Addresses must be obtained. This is to prevent duplication of addresses.

The four numbers in and IP Address are used in different was to identify a particular network and host on that network. There are three classes of Internet Addresses.

CLASS A - supports 16 million hosts on each of 127 networks.
CLASS B - supports 65,000 hosts on each of 16,000 networks.
CLASS C - supports 254 hosts on each of 2 million networks.

LAN	A **LAN** is a computer network that connects a relatively small area (a single building or group of buildings). Most LANs connect work stations and computers to each other. Each computer (also known as a “node”), has its own processing unit and executes its own processing unit and executes its own programs; however it can also access data and devices anywhere on the LAN. This means that many users can access and share the same information and devices. A good example of a LAN device is a network printer. Most companies cannot afford the budgetary or hardware expense of providing printers for each of its users; therefore, one printer (i.e., device) is placed on the LAN where every user can access the same printer. The LAN uses IP Addresses to route data to different destinations on the network. An IP Address is a 32-bit numeric address written as four numbers separated by periods (for example 1.160.10.240).
Port	A **port**, when referring to TCP and UDP networks, is an endpoint in a logical connection. The port number identifies the type of port it is. For example, port 80 is used for HTTP traffic.
Routers	A **router** is a device that forwards data packets over networks. Most commonly, a router is connected to at least two networks (normally LANs or WANs). Routers are located at gateways, the place where two networks are connected. Routers do little data filtering, they mainly deliver the data.
Subnet	A **subnet** is a portion of a network that shares a common address component. On a TCP/IP network, a subnet is described as all computers or devices whose IP Address have the same prefix. Subnetting a network is useful because it provides security for the network as well as increases performance of the network. IP networks are divided using subnet masks
Switches	A **switch** is a device that filters and forwards data packets between networks. Switches operate at the data layer, and sometimes at the network layer.
WAN	A **wide area network** connects two or more LANs and can span a relatively large geographical area. For example, Telex Headquarters in Burnsville, MN is connected to several of its branch offices in Nebraska and Arkansas over the wide area network. The largest WAN is the Internet.

Appendix B

RVON-C Card Serial Port Programming

RVON Serial and Telnet Commands

RVON-C card programming can be done via direct serial or telnet connection. There are several physical connections to an RVON-C card.

- Direct serial through custom debug cable (J7 6-pin bottom front)
  The customer debug cable always functions as the general -purpose debug tool.
- Backcard DB-9 J1
  The backcard DB-9 (must be disabled/enabled via a DIP Switch because it can also be used for serial port pass-through.
  The backcard DB-9 can be used for debug terminal when DIP Switch 6 is switched to the **Closed** position.
- Backcard RJ-45 J2 (Telnet Only)

Setup

Serial Port	38,400 baud, no flow control
Telnet	IP Address, port 23

```
******************************

RVON-C Revision 1.00.02
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Flash File System initialized.



DIP Switch settings:....XXXX

Configuration via AZedit disabled (via DIP Switch 1 on)
Back card UART enabled for pass-through serial (via DIP Switch 6 off)
Boot downloader disabled (via DIP Switch 7 off)
Autoload enabled (via DIP Switch 8 off)

Monitor Revision               1.00.02
Monitor Compilation time       Oct 18 2005, 14:33:52
Processor ID / Revision        0x80 (4Kc) / 0x05
Avalanche Device Type          Avalanche-I, Revision 1.3
Memory Controller Revision     1.204
Endianness                     Big
External Memory rate           Full
CPU Frequ        8 MBytes
RAM size                       64 MBytes
First free RAM address         0x9401f1a8
PLL Mode                       Operating 2.50X
-
Press any key to abort OS load, or wait 1 seconds for OS to boot...
** Defragmenting File System and Environment flash area(s) **
Reading flash file system... No deleted flash file entries found.
Reading environment flash space... Complete.
FlashEraseBlock(b07f8000);
..
Copying environment to flash... Complete.
Loading file /bin/telex1 from FFS
PC: 94020000
FTP done!, PC: 94020000
Target Name: vxTarget
Attached TCP/IP interface to emac unit 0
Attaching network interface lo0... done.
0x97e796f0 (tNetTask): Link is down on EMAC A.
NFS client support not included.

Adding 5160 symbols for standalone.
```

```
appCreate: autoBootLevel=2
MXP environment is created.
Creating RVON application...
-> Bringing DSP subsystem out of reset...
DSP Daughtercard type is set to NONE - No DSP Daughtercard Found
0000004883 - ROOT: FPGA Version = ff00
0000004890 - ROOT: Channel 2 Remote IP Address is unconfigured
0000004892 - ROOT: Channel 3 Remote IP Address is unconfigured
0000004894 - ROOT: Channel 4 Remote IP Address is unconfigured
0000004895 - ROOT: Channel 5 Remote IP Address is unconfigured
0000004897 - ROOT: Channel 6 Remote IP Address is unconfigured
0000004898 - ROOT: Channel 7 Remote IP Address is unconfigured
About to create Idle Task
About to create Measurement Task
Idle Measurement Tasks created
0000004931 - SMGR: tcid 0, expecting remote device connection
0000004931 - SMGR: tcid 0, added to new socket for device 0
0000004931 - SERV: in0000005049 - DSPA: DSP 0,Image 0:Download done!
0000005055 - DSPA: DSP 1,Image 0:Download done!
0000005155 - NMM: ATPM Update Database Granted
0000005255 - NMM: ATPM Configured for RVON operation
0000005255 - NMM: ATPM Update database done
0000005258 - NMM: 0, states: oper=NORMAL, admin=NORMAL, call=IDLE
0000005259 - NMM: 1, states: oper=NORMAL, admin=NORMAL, call=IDLE
0000005260x97e796f0 (tNetTask): Link is up on EMAC A: 100 MBps and FULL duplex.
0000005763 - RVON: port 0, requesting call permission
0000005763 - UDPT: error - CALL_REQUEST: don't send to an RVON-1 or RVON-IO till
 ports known
0000005813 - RVON: port 1, requesting call permission
0000005813 - RVON: port 1, call permission granted, initiate call
0000005814 - RVON: p: CBRX_RVON_ALPHAS
0000005832 - FNRX: CBRX_ANALOG_TRIM
0000005832 - FNRX: CBRX_POLL_DELAYS, ignored
0000005833 - NMM: 1, states: oper=NORMAL, admin=NORMAL, call=SEIZED
0000005833 - NMM: 1, states: oper=NORMAL, admin=NORMAL, call=SETUP
0000005834 - FNRX: CBRX_VOX_PARAMS
```

Access Serial Command Mode

There are many different serial port commands supported from here, but it is NOT recommended that any be used except:

dbgcmd

1. At a DOS prompt, type "**dbgcmd**", then press **Return**.
   This places the serial port into the MXP> (MXP command mode). The MXP Command Mode is the only mode used. The table below is a list of commands supported from the MXP Shell Prompt.

TABLE 4. Serial Command Table

Command	Variable 1	Variable 2	Description
set rvon			Help screen which lists all “set rvon” commands.
set rvon	ip_addr	X.X.X.X	Set the IP Address for the RVON Card.
set rvon	netmask	X.X.X.X	Set network mask for the RVON Card.
set rvon	gateway	X.X.X.X	Set the gateway IP Address for the RVON-8 card.
set rvon	user	abcdefg	Set the RVON user name for telnet access. *Default “telex”*
set rvon	password	abcdefg	Set the RVON password for telnet access (8-40 characters). *Default “password”*
set rvon	vad_threshold	[adaptive|#]	Set the VAD threshold (silence detection) Adaptive refers to auto-select. The # can be -20 to +10dBm.
set channel [chan]			Help screen which lists all “set tcid” commands (TCID 0-7).
set channel [chan]	dest_ip	X.X.X.X	Set the destination IP Address for this particular RVON_Channel (same as tcid).
set channel [chan]	dest_type	X	dest_type X = 0 (rvon-8 or rvon-C), 1 (rvon-1), 2 (rvon-I/O).
set channel [chan]	chan_codec	X	Set the profile to use which includes the compression codec see below (0-27).
set channel [chan]	onhook		Force the channel to disconnect the port.
set channel [chan]	offhook		Force the channel to connect the port.
set emac auto*			Enables auto-negotiation of the Ethernet interface configuration.
set emac 10 half			Configures the Ethernet interface for 10Mbps half duplex.
set emac 10 full			Configures the Ethernet interface for 10Mbps full duplex.
set emac 100 half			Configures the Ethernet interface for 100 Mbps half duplex.
set emac 100 full			Configures the Ethernet interface for 100 Mbps full duplex.
set serial	ip_addr	X.X.X.X	Set the destination IP Address for this serial pass-through port.
set serial	baud	X	Set the baud rate to use: 50 through 115000.

TABLE 4. Serial Command Table

Command	Variable 1	Variable 2	Description
activate			Must do an activate command to cause changes to take effect.
show rvon			Display current settings
show serial			Display current settings
show channel [chan]			Display current settings
show emac			Display current settings

Figure 5. Codec Specifications

Coding Profile	Codec	Codec Rate	Audio (ms) / Packet	Packets/Second	Encoded Audio (bytes)	IP Overhead (bytes)	Total Packet Size (bytes)	Bandwidth (Bytes/sec)	Bandwidth (kbps/side)	Bandwidth (kbps/channel)
0,3,6,9	G.711	64k	10	100.00	80	60	140	14000	112	224
1,4,7,10	G.711	64k	20	50.00	160	60	220	11000	88	176
2,5,8,11	G.711	64k	30	33.33	240	60	300	10000	80	160
12,16	G.729	8k	10	100.00	10	60	70	7000	56	112
13,17	G.729	8k	20	50.00	20	60	80	4000	32	64
14,18	G.729	8k	40	25.00	40	60	100	2500	20	40
15,19	G.729	8k	60	16.67	60	60	120	2000	16	32
20,22	G.723	5.3k	30	33.33	24	60	84	2800	22.4	44.8
24,26	G.723	6.3k	30	33.33	24	60	84	2800	22.4	44.8
21,23	G.723	5.3k	60	16.67	48	60	108	1800	14.4	28.8
25,27	G.723	6.3k	60	16.67	48	60	108	1800	14.4	28.8

NOTE: A channel consists of a transmitting and a receiving side, so the bandwidth is double for a bi-directional audio stream.

NOTE: Bandwidth values are approximate maximums, actual bandwidth could be considerably lower with VAD enabled.

Codec: Determines how the audio is compressed/decompressed and the name given to the defined algorithm

Coded Rate: Actual bits per second of the audio in compressed form. This is sent over the network through various data packets. Network efficiency can be calculated with an IP header for each packet of X ms of audio.

Size: Amount of audio in each IP Packet, milliseconds (ms).

VAD: Voice Activity Detection, when enabled and only when audio is above a certain threshold, will send packets. Otherwise, a silence packet is went once, and not again until audio is above the threshold. Enabling this will result in a more efficient network, but care must be taken because of the Mother's Day phenomenon. If there is ever a need to have all audio paths open and active, a network designer must account for this scenario.

RVON-C Default Setup

Every attempt is made to ensure the board is shipped from the factory containing the following:

All are "**set rvon**" commands

VARIABLE	ENVIRONMENT NAME	DEFAULT VALUE	DESCRIPTION
ip_addr	EMACA_IPADDR	x.x.x.x	IP Address for the RVON-C Card
netmask	EMACA_NETMASK	255.255.255.0	Network Mask for the RVONC card
gateway	EMACA_GW	none	Gateway IP Address for the RVON-C Card
serial_ip	RVON_SERIAL_IP	none	Pass-thru serial port IP Address for the RVON-C Card
serial_baud	RVON_SERIAL_ Baud	9600	Set the pass-thru serial port baud rate for the RVON-C Card
user	RVON_USER	telex	RVON-C user name for telnet access
password	RVON_PASSWORD	password	RVON-C password for telnet access (8-40 characters)
vad_threshold	RVON_THRESHOLD_VAD	10	VAD Threshold

There are more parameters that the software will auto-configure if they have not been previously setup. The user can also set these parameters, in which case the software would not modify but take them as they are.

All are "set chan #" commands because they are for each audio channel.

VARIABLE	ENVIRONMENT NAME	DEFAULT VALUE	DESCRIPTION
dest_ip	RVON_DEST_IP_#	X.X.X.X	Destination IP Address for this particular RVON_CH
dest_type	RVON_DEST_TYPE_3	X	Destination Type Y= 0 (RVON-C), 1 (rvon-1), 2 (rvon-I/O)
dest_chan	RVON_DEST_CHAN_#	X	Destination Channel - what port of far end (0-7)
chan_codec	RVON_CHAN_CODEC_#	X	Profile to use (previous coding table)

Typing "printenv", then pressing Return from an RVON-C boot code or "sys-printenv" from the MXP Debug System Prompt may show these commands. The Environment name is listed because this is the label used by the software.

IMPORTANT: If the user is attempting to do a "setenv" to change a parameter from the RVON-C boot code, the Environment Name must be used and NOT the "set rvon variable" name.

Appendix C

RVON-C Quick Start

This guide explains briefly how to install and configure an RVON-C card in a Cronus system. It contains the following sections

1. Install the front card and the back card into Cronus.
2. Connect Ethernet
3. Connect to Cronus frame in AZedit
4. Configure the RVON-C card
5. Configure the devices the card will connect with
6. Begin Operation.

NOTE: If you are connecting using Serial Pass-Through Port, See “RVON-C Card Serial Port Programming” on page 69.

Install Front and Back Cards in Cronus

When inserting the RVON-C card into Cronus, the following considerations need to be made:

- Gently insert the RVON-C card into the correct slot. If the card is forced or twisted while inserting, a pin on the backplane could short or break causing the card to become inoperable.
- When inserting the RVON-C card into Cronus, be sure to insert it into a compatible back card. If the card is inserted into an incompatible back card, undesirable results can occur.

Plug in Ethernet

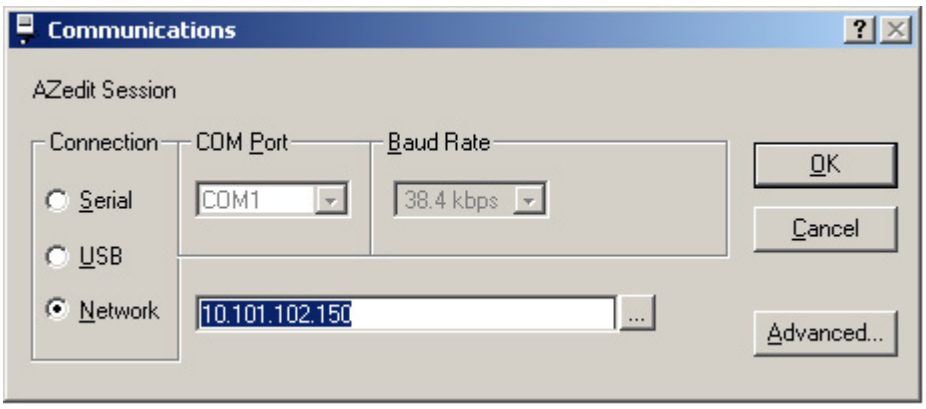
Verify there is an Ethernet connection from the RVON-C card (J2 Ethernet on the back of the Cronus) to the network.

Launch AZedit and Connect to the Cronus Frame

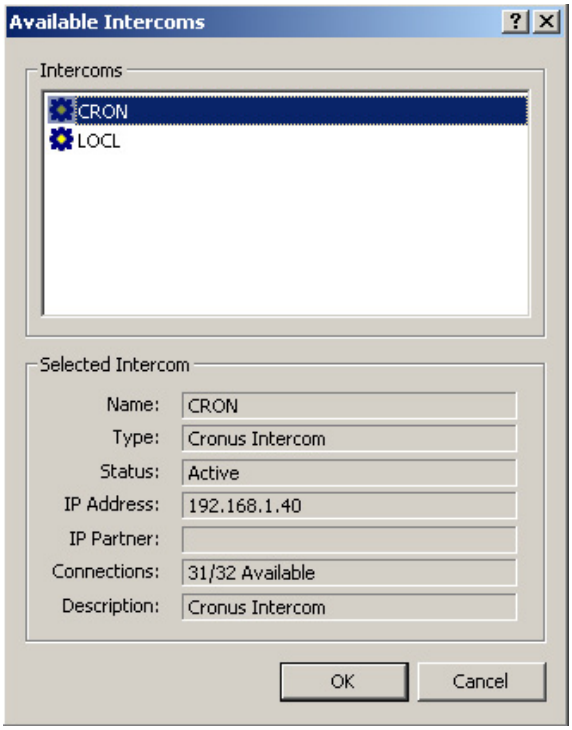
NOTE: You can connect to Cronus using Serial, USB, or Network Connections. The following instructions show how to connect using a Network connection. For more information on configuring the network connection for the Cronus, see page 27.

To **connect to the Cronus system from AZedit**, do the following:

1. From the Options menu, select **Communications**.
   The Communications screen appears.

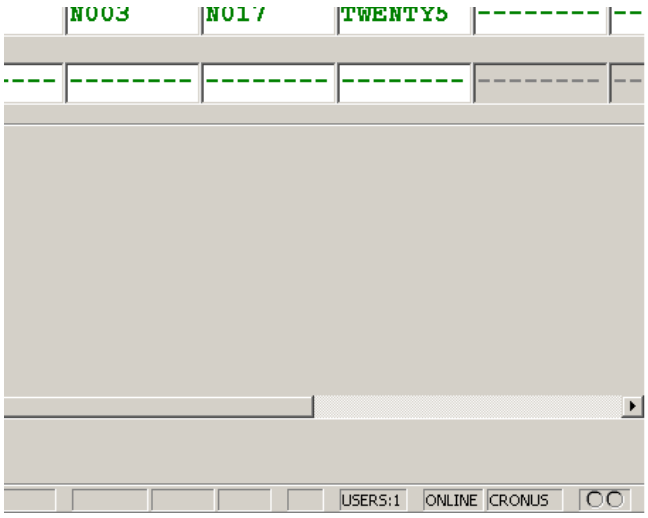


2. Verify that **Network** is selected.
3. Press the **browse** button next to the Main IP Address field.
   The Available Intercoms screen appears.



4. Highlight **Cronus** in the Intercoms window and click **OK**.

5. Click **OK** when the Configuration Change message appears.



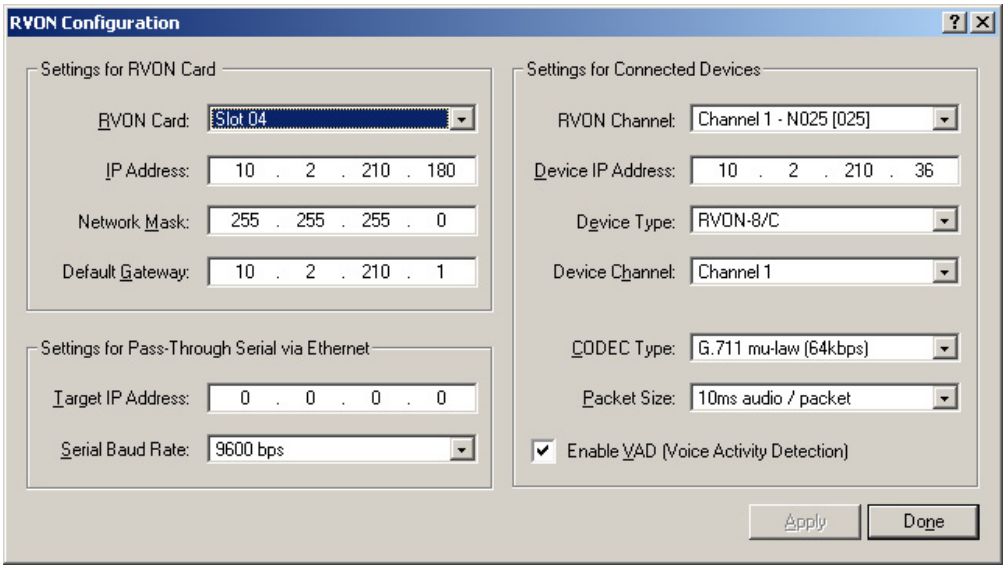
You will now see **CRONUS** in the lower right hand corner of the AZedit application.

Configure the RVON-C Card

Once you have a connection to Cronus, you are now ready to configure the RVON-C card within the Cronus system.

To **configure the RVON-C card**, do the following:

1. From the Navigation bar at the bottom of the AZedit application, click the **RVON** button.
The RVON Configuration screen appears.


RVON Configuration
Settings for RVON Card
RVON Card: Slot 04
IP Address: 10 . 2 . 210 . 180
Network Mask: 255 . 255 . 255 . 0
Default Gateway: 10 . 2 . 210 . 1
Settings for Pass-Through Serial via Ethernet
Target IP Address: 0 . 0 . 0 . 0
Serial Baud Rate: 9600 bps
Settings for Connected Devices
RVON Channel: Channel 1 - N025 [025]
Device IP Address: 10 . 2 . 210 . 36
Device Type: RVON-8/C
Device Channel: Channel 1
CODEC Type: G.711 mu-law (64kbps)
Packet Size: 10ms audio / packet
Enable VAD (Voice Activity Detection)
Apply
Done

2. From the RVON Card drop down list, select the **slot** in which the RVON-C card resides, if it is not already selected.
3. In the IP Address field, enter the **IP Address** you have assigned to the RVON-C card.

4. In the Network Mask field, enter the **Network Mask** of the network to which the RVON-C card is connected.
5. In the Default Gateway field, enter the **Default Gateway Address** (if applicable) of the network to which the RVON-C card is connected.
   A Default Gateway is only required if the RVON-C connections are between LANs or WANs.

Under Settings for Pass-Through Serial via Ethernet

6. In the Target IP Address field, enter the **Target IP Address** of the device you want to connect to over the Ethernet.
7. From the Serial Baud Rate drop down list, select the **baud rate** at which the data is transmitted.

Under Settings for Connected Devices

> **NOTE:** You MUST configure the channel settings on each end of a connection and ensure the same codec and packet size are select at each end. Remember, the RVON-C card has different channels which can be configured.

8. In the RVON-C Channel drop down list, select the **channel** you want to use to communicate to another device across the network.
9. In the Device IP Address field, enter the **IP Address** of the device to which you want to connect.
10. From the Device Type drop down list, select the **type of device** to which the RVON-C card is connecting.
11. From the Device Channel drop down list, select the **channel** on the device to which the RVON-C card will communicate.
12. From the CODEC Type drop down list, select the **CODEC type** you want to use for this channel.
13. From the Packet Size drop down list, select the **size** of each audio packet.

> **NOTE:** A CODEC is an algorithm used to compress audio. There are 5 Codices supported by Telex: G.711µs law, G.711A law, G.729AB, G.723 (5.3k), G.723 (6.3k). The type of CODEC will dictate the quality of audio you hear and the network bandwidth used. The packet size determines how much audio data is carried across the network in each transmitted packet. The CODEC type and packet size chosen require different amounts of bandwidth from the network (See “Codec Specifications” on page 75). As with the CODEC type, the packet size you choose for the audio transfer will affect the audio you hear and the bandwidth you use over the network. The larger the audio packet you choose to use, the lower the bandwidth used. However, the larger packet size can result in a higher delay and longer gaps if the packet is lost. On the other had, smaller packet sizes result in larger bandwidth use, but lower delays and smaller gaps if the packet is lost. The Intercom System Engineer and the Network Administrator may want to work together in choosing the CODEC type and packet size suitable for the size of the network, so degradation of network resources does not happen.

14. Select **Enable VAD (Voice Activity Detection)**, if you want to conserve bandwidth when the audio level is below a given threshold.

> **NOTE:** Voice Activity Detection saves network bandwidth by stopping the flow of audio packets when silence is detected. VAD is similar to VOX.

At this point you may choose another channel to configure or choose another card to configure.

15. Once you are completely finished, click **Apply**.
    Apply sends all of the changes to all the cards in the intercom, or click Cancel to discard all changes you make.

Configure the Devices Connected to the RVON-C Card

See the device user manual for specific configuration instructions

Setting up a Serial Pass-Through Connection or Serial Connection

If you plan to pass data using either a Serial Pass-Through or Serial Connection you will need to set the DIP switches and jumpers to reflect which connection you will want to use.

NOTE: When making adjustments to the DIP switches and jumpers, you will need to take the front card out of the Cronus.

To **use the Serial Pass-Through**, do the following:

1. Set DIP Switch 6 to the **OPEN** position.
2. Set the **serial protocol**, either RS232 or RS485:
   - For RS232, jumper pins 2 & 3 of J10, J11, and J12
   - For RS485, jumper pins 1 & 2 of J10, J11, and J12
3. Once you have set the correct configurations, replace the **RVON-C into Cronus** and hook the DB-9 connector to the RVON-C backcard.

To **use the Serial connection**, do the following:

1. Set DIP Switch 6 to the **CLOSED** position.
2. Set the **serial protocol**, either RS232 or RS485:
   - For RS232, jumper pins 2 & 3 of J10, J11, and J12
   - For RS485, jumper pins 1 & 2 of J10, J11, and J12
3. Once you have set the correct configuration, replace the **RVON-C into Cronus** and hook the DB-9 connector to the RVON-C backcard.
4. Use Table 4, “Serial Command Table,” on page 73 to **configure** you RVON-C card.

Appendix D

Breakout Panels

Breakout Panels provide a convenient way of expanding the port capacity of a Cronus Intercom System. Currently, there are three breakout panels for use with the Cronus MDR backcard: XCP-32-DB9, XCP-48-RJ45, and XCP-48-Telco. On the Cronus you can have up to four MDR backcards mounted on the chassis to give you that many more keypanel ports.

Pin Number	Port	Function
8	1	Data +
33	1	Data -
24	1	Audio to Matrix +
49	1	Audio to Matrix -
25	1	Audio from Matrix +
50	1	Audio from Matrix -
7	2	Data +
32	2	Data -
22	2	Audio to Matrix +
47	2	Audio to Matrix -
23	2	Audio from Matrix +
48	2	Audio from Matrix -
6	3	Data +
31	3	Data -
20	3	Audio to Matrix +
45	3	Audio to Matrix -
21	3	Audio from Matrix +
46	3	Audio from Matrix -
5	4	Data +
30	4	Data -
18	4	Audio to Matrix +
43	4	Audio to Matrix -
19	4	Audio from Matrix +
44	4	Audio from Matrix -
4	5	Data +
29	5	Data -
16	5	Audio to Matrix +
41	5	Audio to Matrix -
17	5	Audio from Matrix +
42	5	Audio from Matrix -
3	6	Data +
28	6	Data -
14	6	Audio to Matrix +
39	6	Audio to Matrix -
15	6	Audio from Matrix +
40	6	Audio from Matrix -
2	7	Data +
27	7	Data -
12	7	Audio to Matrix +
37	7	Audio to Matrix -
13	7	Audio from Matrix +
38	7	Audio from Matrix -
1	8	Data +
26	8	Data -
10	8	Audio to Matrix +
35	8	Audio to Matrix -
11	8	Audio from Matrix +
36	8	Audio from Matrix -

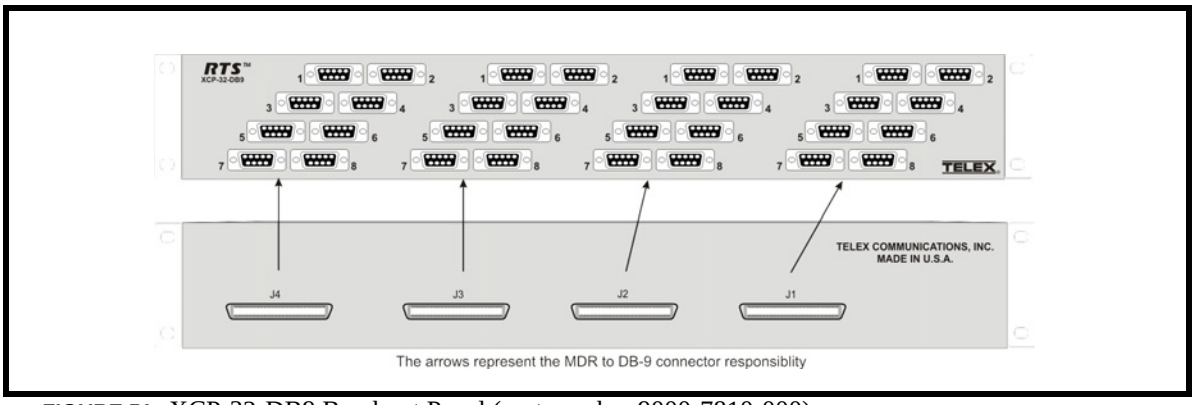


FIGURE 51. XCP-32-DB9 Breakout Panel (part number 9000-7810-000)

The XCP-48-DB9 breakout panel is the newly created 32-port DB9 breakout panel with MDR connecotr for the AIO-16. It allows you to expand the number of DB-9 serial ports on the Cronus.

NOTE: When using the 32-port DB-9 breakout panel, you must use the MDR backcard

Pin Number	PORT	FUNCTION
8	1	Data +
33	1	Data -
24	1	Audio to Matrix +
49	1	Audio to Matrix -
25	1	Audio from Matrix +
50	1	Audio from Matrix -
7	2	Data +
32	2	Data -
22	2	Audio to Matrix +
47	2	Audio to Matrix -
23	2	Audio from Matrix +
48	2	Audio from Matrix -
6	3	Data +
31	3	Data -
20	3	Audio to Matrix +
45	3	Audio to Matrix -
21	3	Audio from Matrix +
46	3	Audio from Matrix -
5	4	Data +
30	4	Data -
18	4	Audio to Matrix +
43	4	Audio to Matrix -
19	4	Audio from Matrix +
44	4	Audio from Matrix -
4	5	Data +
29	5	Data -
16	5	Audio to Matrix +
41	5	Audio to Matrix -
17	5	Audio from Matrix +
42	5	Audio from Matrix -
3	6	Data +
28	6	Data -
14	6	Audio to Matrix +
39	6	Audio to Matrix -
15	6	Audio from Matrix +
40	6	Audio from Matrix -
2	7	Data +
27	7	Data -
12	7	Audio to Matrix +
37	7	Audio to Matrix -
13	7	Audio from Matrix +
38	7	Audio from Matrix -

Pin Number	PORT	FUNCTION
1	8	Data +
26	8	Data -
10	8	Audio to Matrix +
35	8	Audio to Matrix -
11	8	Audio from Matrix +
36	8	Audio from Matrix -

NOTE: There are 4 MDR connectors on the XCP-32-DB9 Breakout Panel.

MDR Connector	Port
J1	1-8
J2	9-16
J3	17-24
J4	25-32

Pin	Description
Pin 1	Keypanel Data +
Pin 2	Keypanel Data -
Pin 3	GND
Pin 4	Audio to Matrix +
Pin 5	Audio to Matrix -
Pin 6	GND
Pin 7	Audio from Matrix -
Pin 8	Audio from Matrix +
Pin 9	GND

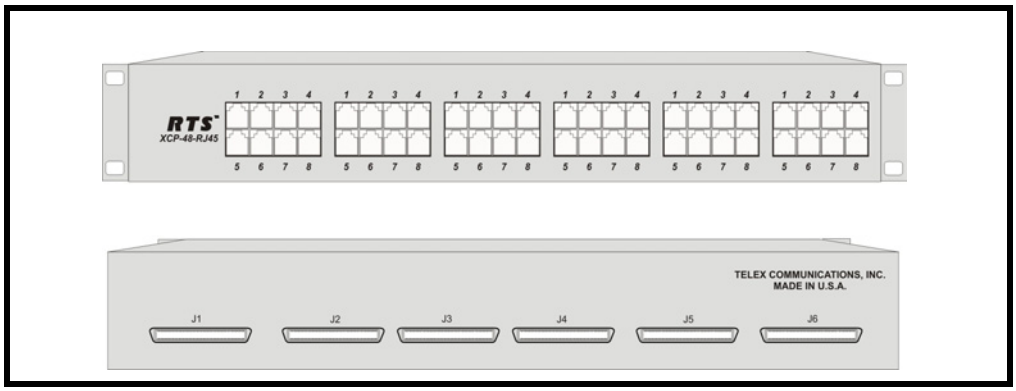


FIGURE 52. XCP-48-RJ45 Breakout Panel (part number 9000-7809-000)

The XCP-48-RJ45 is the newly created 48-port RJ45 breakout panel with MDR connector for the Cronus. It allows you to expand the number of RJ-45 ports on the ADAM system, up to 48 ports.

NOTE: When using the 48-port RJ-45 breakout panel, you must use the MDR backcard with the Cronus.

Pin Number	Port	Function
8	1	Data +
33	1	Data -
24	1	Audio to Matrix +
49	1	Audio to Matrix -
25	1	Audio from Matrix +
50	1	Audio from Matrix -
7	2	Data +
32	2	Data -
22	2	Audio to Matrix +
47	2	Audio to Matrix -
23	2	Audio from Matrix +
48	2	Audio from Matrix -
6	3	Data +
31	3	Data -
20	3	Audio to Matrix +
45	3	Audio to Matrix -
21	3	Audio from Matrix +
46	3	Audio from Matrix -
5	4	Data +
30	4	Data -
18	4	Audio to Matrix +
43	4	Audio to Matrix -
19	4	Audio from Matrix +
44	4	Audio from Matrix -
4	5	Data +
29	5	Data -
16	5	Audio to Matrix +
41	5	Audio to Matrix -
17	5	Audio from Matrix +
42	5	Audio from Matrix -
3	6	Data +
28	6	Data -
14	6	Audio to Matrix +
39	6	Audio to Matrix -
15	6	Audio from Matrix +
40	6	Audio from Matrix -
2	7	Data +
27	7	Data -
12	7	Audio to Matrix +
37	7	Audio to Matrix -
13	7	Audio from Matrix +
38	7	Audio from Matrix -

Pin Number	Port	Function
1	8	Data +
26	8	Data -
10	8	Audio to Matrix +
35	8	Audio to Matrix -
11	8	Audio from Matrix +
36	8	Audio from Matrix -

NOTE: There are 6 MDR Connector on the XCP-48 Telco Breakout

MDR Connector	port
J1	41-48
J2	33-40
J3	25-32
J4	17-24
J5	9-16
J6	1-8

Pin	Description
Pin 1	N/A
Pin 2	Keypanel Data -
Pin 3	Audio Out +
Pin 4	Audio In +
Pin 5	Audio In -
Pin 6	Audio Out -
Pin 7	Keypanel Data +
Pin 78	N/A

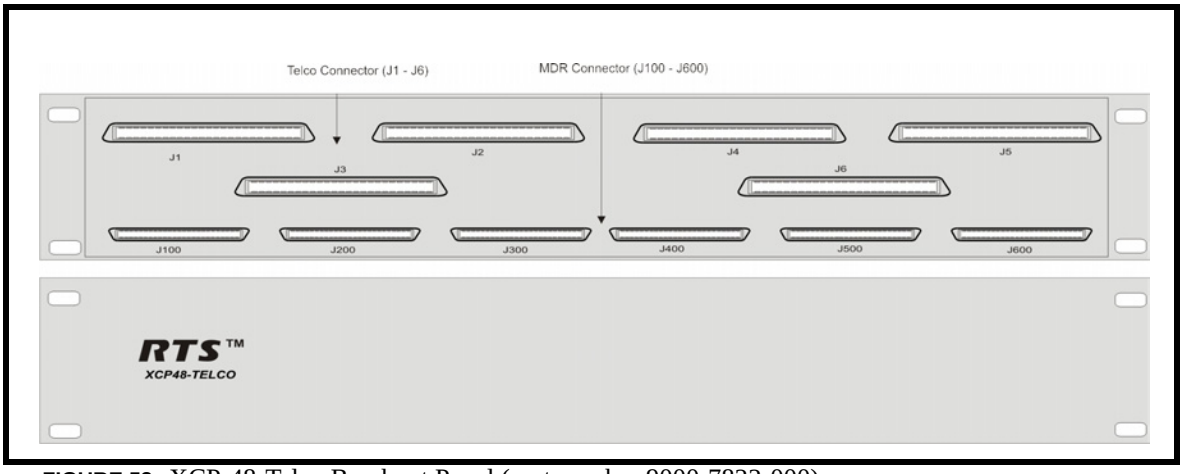


FIGURE 53. XCP-48-Telco Breakout Panel (part number 9000-7822-000)

The XCP-48-Telco is the newly created breakout panel with MDR connector for the Cronus. It combines audio to matrix, audio from matrix, and data pairs. It then routes them on individual Telco connectors.

NOTE: When using the XCP-48-Telco breakout panel, you must use the MDR backcard with the Cronus.

Pin Number	Port	Function
8	1	Data +
33	1	Data -
24	1	Audio to Matrix +
49	1	Audio to Matrix -
25	1	Audio from Matrix +
50	1	Audio from Matrix -
7	2	Data +
32	2	Data -
22	2	Audio to Matrix +
47	2	Audio to Matrix -
23	2	Audio from Matrix +
48	2	Audio from Matrix -
6	3	Data +
31	3	Data -
20	3	Audio to Matrix +
45	3	Audio to Matrix -
21	3	Audio from Matrix +
46	3	Audio from Matrix -
5	4	Data +
30	4	Data -
18	4	Audio to Matrix +
43	4	Audio to Matrix -
19	4	Audio from Matrix +
44	4	Audio from Matrix -
4	5	Data +
29	5	Data -
16	5	Audio to Matrix +
41	5	Audio to Matrix -
17	5	Audio from Matrix +
42	5	Audio from Matrix -
3	6	Data +
28	6	Data -
14	6	Audio to Matrix +
39	6	Audio to Matrix -
15	6	Audio from Matrix +
40	6	Audio from Matrix -
2	7	Data +
27	7	Data -
12	7	Audio to Matrix +
37	7	Audio to Matrix -
13	7	Audio from Matrix +
38	7	Audio from Matrix -

Pin Number	Port	Function
1	8	Data +
26	8	Data -
10	8	Audio to Matrix +
35	8	Audio to Matrix -
11	8	Audio from Matrix +
36	8	Audio from Matrix -

NOTE: There are 6 MDR Connectors on the XCP-48-TELCO Breakout Panel.

MDR Connector	port
J1	1-8
J2	9-16
J3	17-24
J4	25-32
J5	33-40
J6	41-48

Telco Backcard
Telco Connector J1, J4

Pin Number	Port	Function
1	1	Audio to Matrix +
26	1	Audio to Matrix -
2	2	Audio to Matrix +
27	2	Audio to Matrix -
3	3	Audio to Matrix +
28	3	Audio to Matrix -
4	4	Audio to Matrix +
29	4	Audio to Matrix -
5	5	Audio to Matrix +
30	5	Audio to Matrix -
6	6	Audio to Matrix +
31	6	Audio to Matrix -
7	7	Audio to Matrix +
32	7	Audio to Matrix -
8	8	Audio to Matrix +
33	8	Audio to Matrix -
9	9	Audio to Matrix +
34	9	Audio to Matrix -
10	10	Audio to Matrix +
35	10	Audio to Matrix -
11	11	Audio to Matrix +
36	11	Audio to Matrix -
12	12	Audio to Matrix +
37	12	Audio to Matrix -
13	13	Audio to Matrix +
38	13	Audio to Matrix -
14	14	Audio to Matrix +
39	14	Audio to Matrix -
15	15	Audio to Matrix +
40	15	Audio to Matrix -
16	16	Audio to Matrix +
41	16	Audio to Matrix -
17	17	Audio to Matrix +
42	17	Audio to Matrix -
18	18	Audio to Matrix +
43	18	Audio to Matrix -
19	19	Audio to Matrix +
44	19	Audio to Matrix -
20	20	Audio to Matrix +
45	20	Audio to Matrix -
21	21	Audio to Matrix +
46	21	Audio to Matrix -
22	22	Audio to Matrix +
47	22	Audio to Matrix -

Table 6. Telco Backcard Connector (J1, J4)

Table 6. Telco Backcard Connector (J1, J4)

Pin Number	Port	Function
23	23	Audio to Matrix +
48	23	Audio to Matrix -
24	24	Audio to Matrix +
49	24	Audio to Matrix -

Table 6. Telco Backcard Connector (J1, J4)

Cronus Master Controller Card
9030-7785-000

Legacy Master Controller Card Jumper Settings

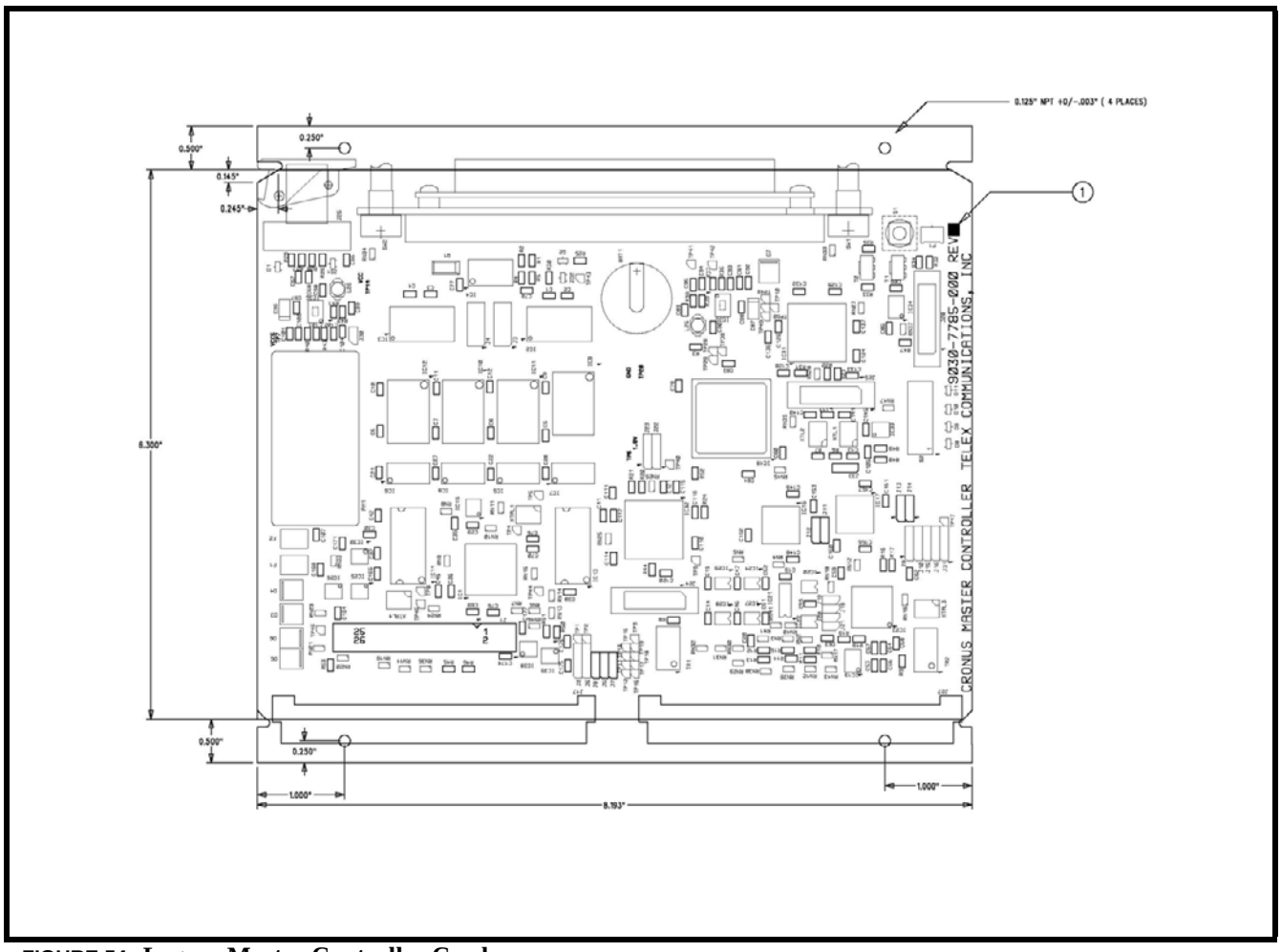


FIGURE 54. Legacy Master Controller Card

CONNECTOR	DESCRIPTION	DEFAULT SETTING
J3 & 4	J Tag Connector and Flash Write Protect	Populate across pins 1 & 2 and 9 & 10
J5	Cold Fire Test Mode	Populate across pins 1 & 2
J30	+5 Volt Jumper	
J33	44k / 48k mode select	
J7	J Tag Mode	Populate across pins 2 & 3
J8	DRAM reset in debug mode	
J24 & J25	DSP Debug Ports	Populate across pins 5-6, 7-8, 9-10, and 11-12

Notes

APPENDIX F

RVON Trunking Connections

In this chapter you will find the following drawings:

- AZedit Via RVON-8 RS-232 Mode
- CS9500 Trunking Via RVON-I/O To RVON-8
- ADAM Trunking Via RVON-8
- Zeus II Trunking Via RVON-I/O To RVON-C
- Cronus Trunking Via RVON-I/O To RVON-8

Figure 7: AZedit Via RVON-8 RS-232 Mode

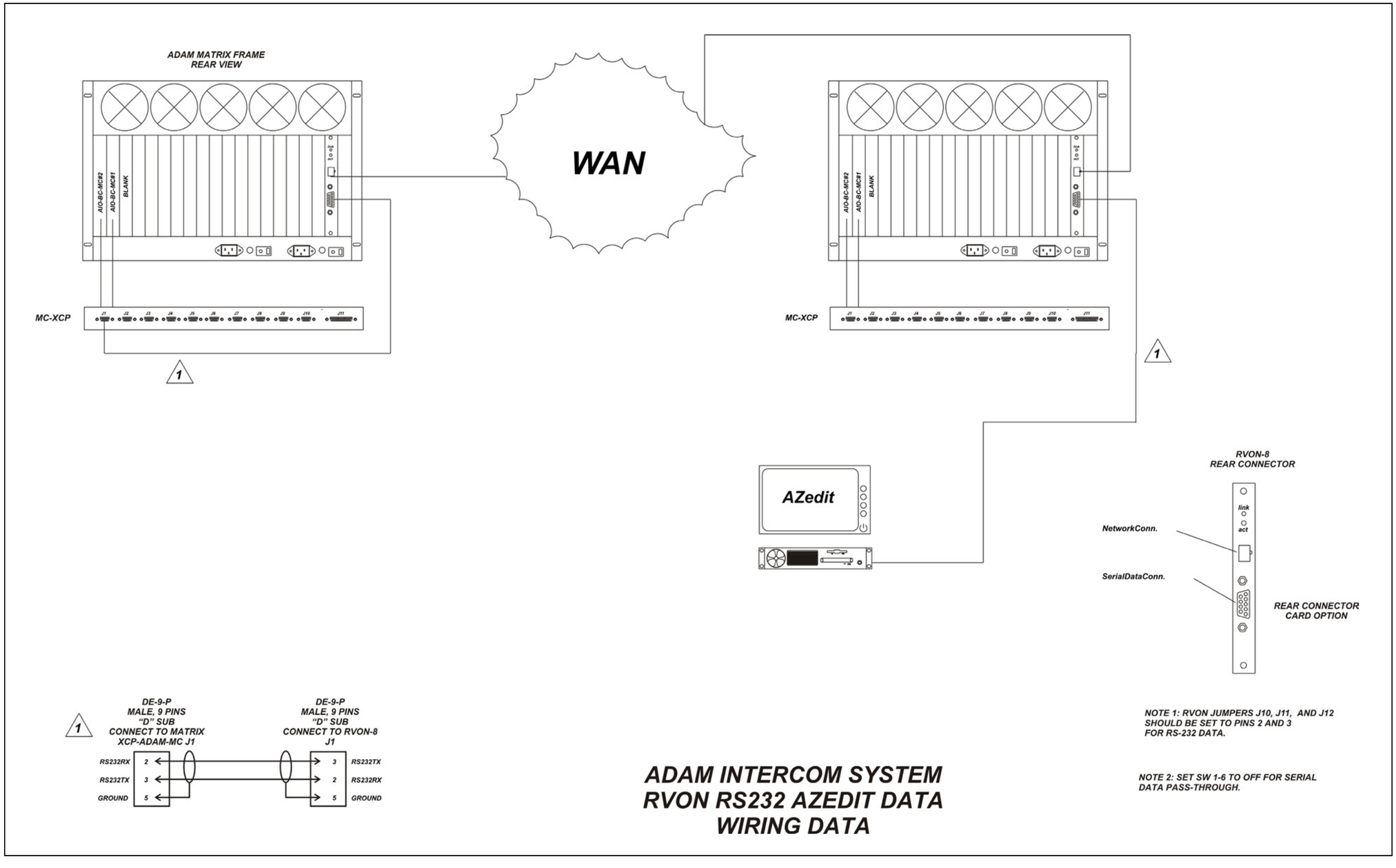


Figure 8: CS9500 Trunking Via RVON-I/O To RVON-8

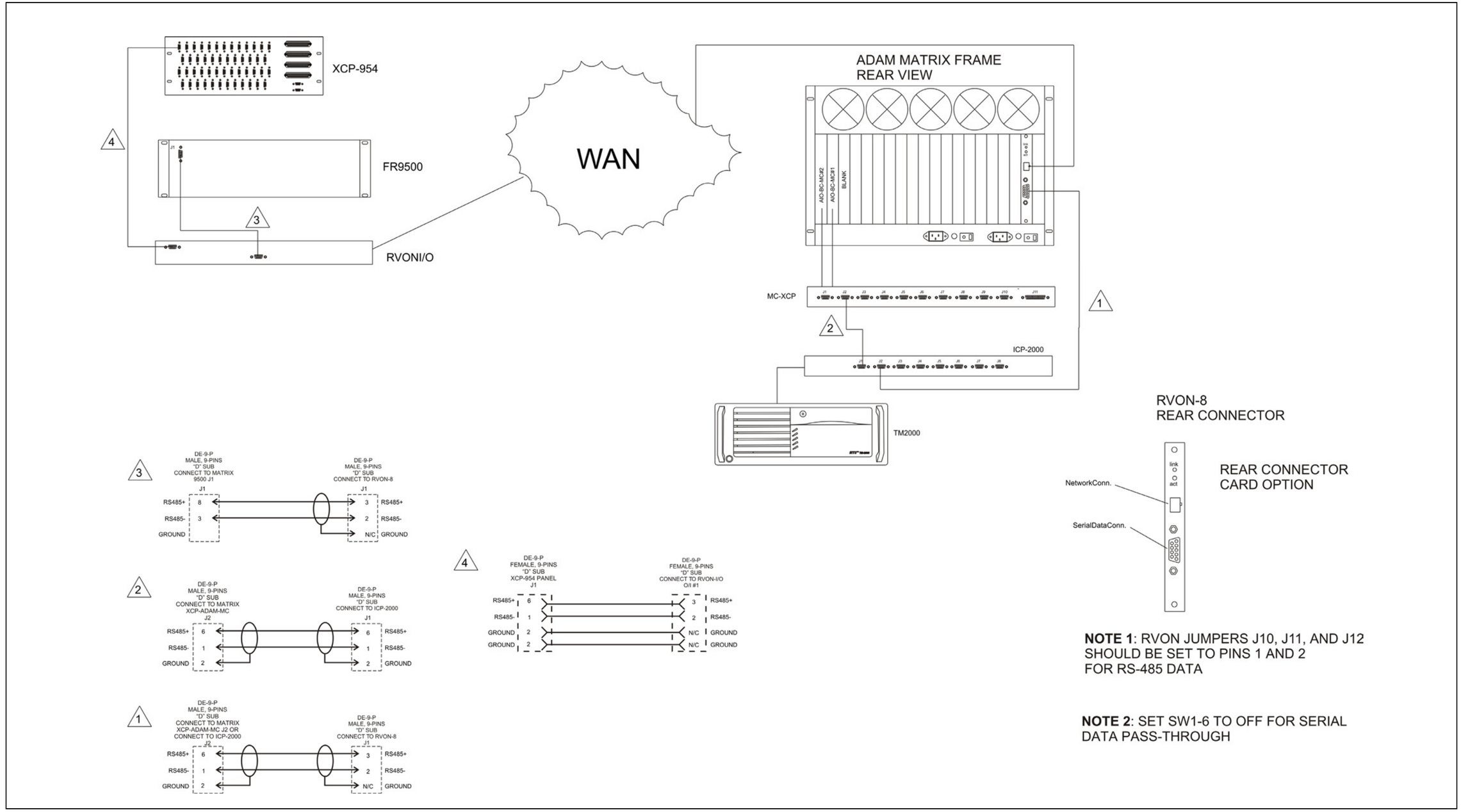


Figure 9: ADAM Trunking Via RVON-8

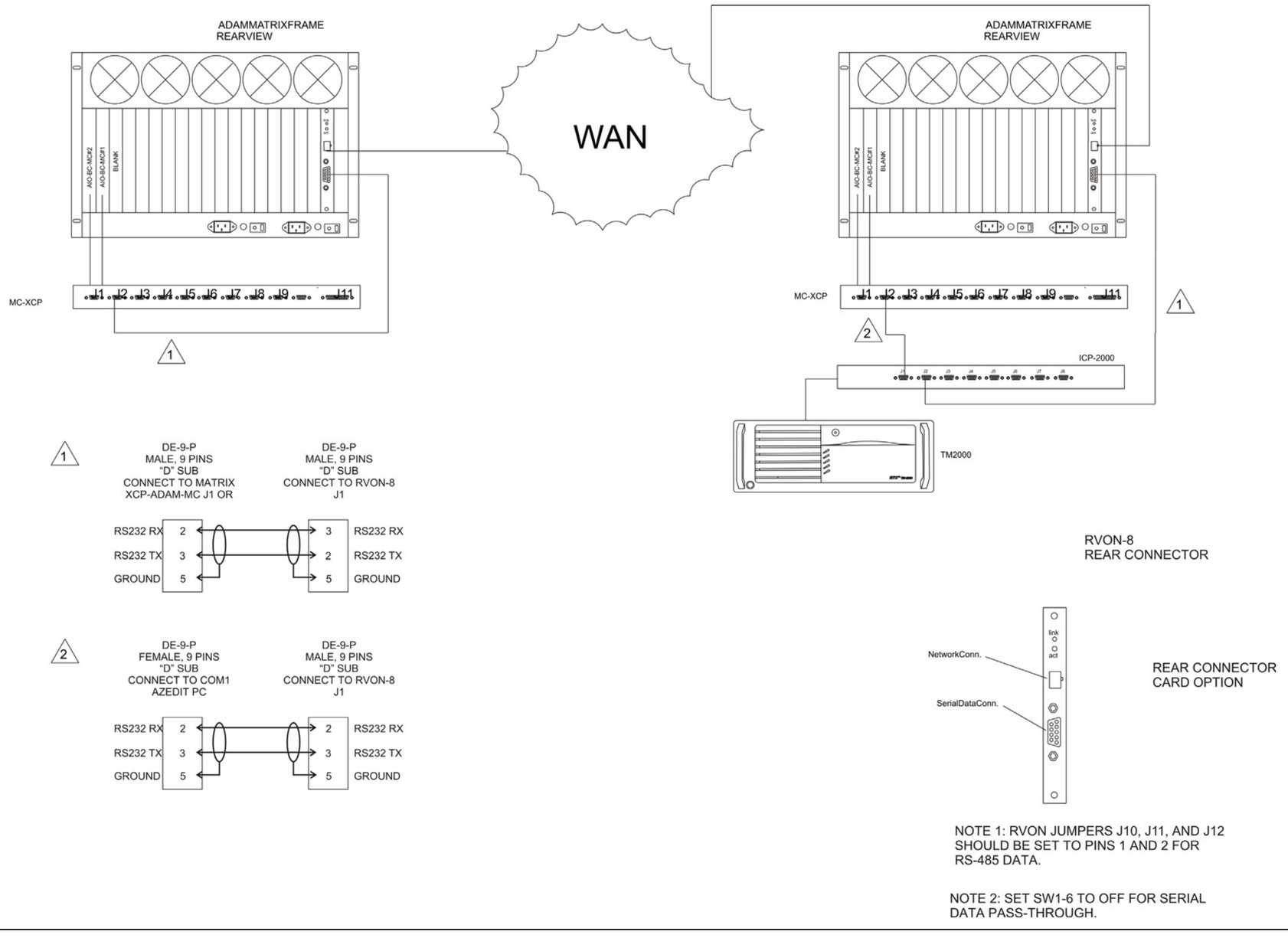


Figure 10: Zeus II Trunking Via RVON-I/O to RVON-C

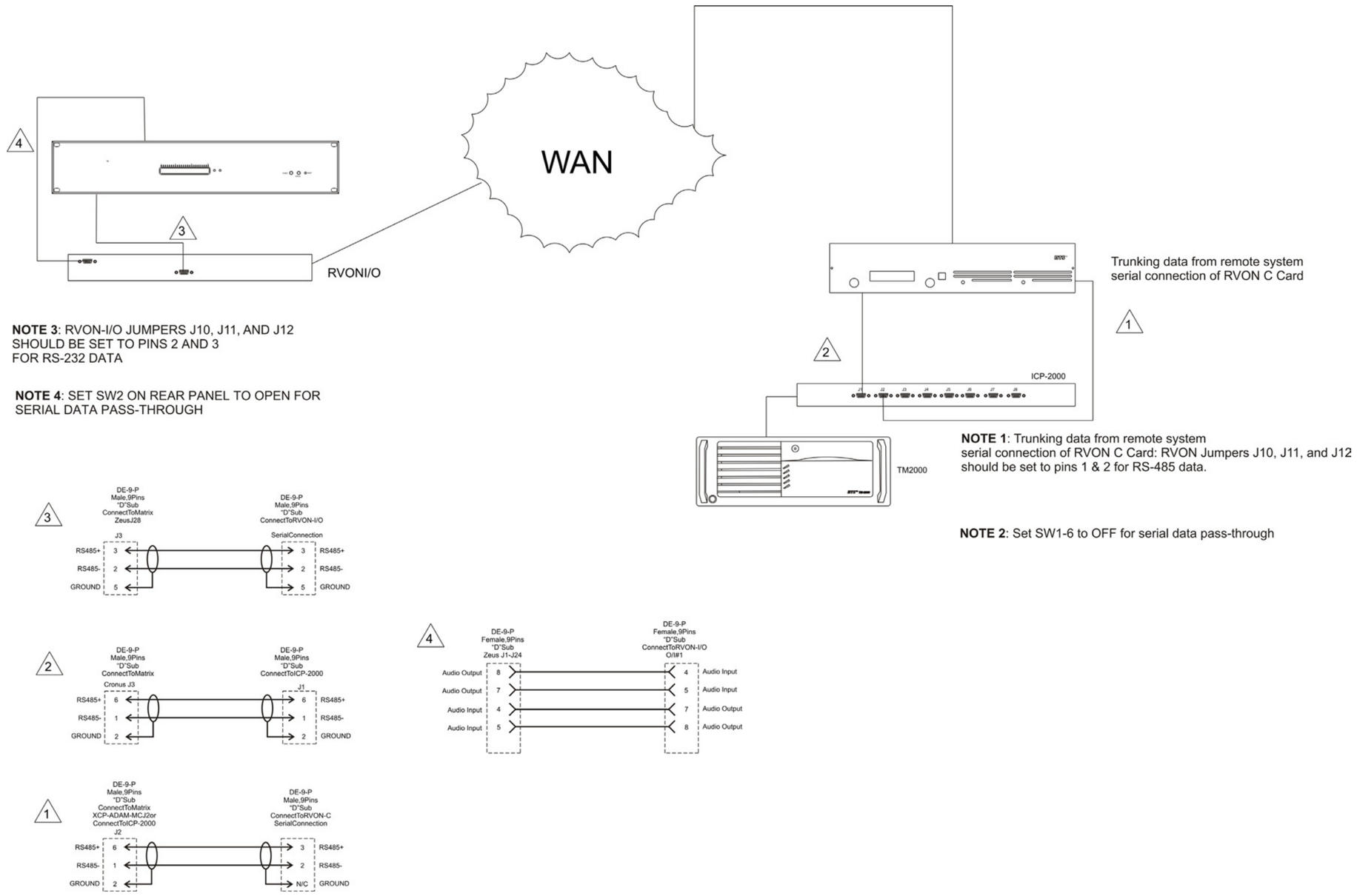

WAN
RVONI/O
4
3
2
1
ICP-2000
TM2000
Trunking data from remote system
serial connection of RVON C Card
NOTE 3: RVON-I/O JUMPERS J10, J11, AND J12
SHOULD BE SET TO PINS 2 AND 3
FOR RS-232 DATA
NOTE 4: SET SW2 ON REAR PANEL TO OPEN FOR
SERIAL DATA PASS-THROUGH
NOTE 1: Trunking data from remote system
serial connection of RVON C Card: RVON Jumpers J10, J11, and J12
should be set to pins 1 & 2 for RS-485 data.
NOTE 2: Set SW1-6 to OFF for serial data pass-through
DE-9-P Male,9Pins "D"Sub ConnectToMatrix ZeusJ28
DE-9-P Male,9Pins "D"Sub ConnectToRVON-I/O
J3
SerialConnection
RS485+ 3 3 RS485+
RS485- 2 2 RS485-
GROUND 5 5 GROUND
DE-9-P Male,9Pins "D"Sub ConnectToMatrix
DE-9-P Male,9Pins "D"Sub ConnectToICP-2000
Cronus J3
J1
RS485+ 6 6 RS485+
RS485- 1 1 RS485-
GROUND 2 2 GROUND
DE-9-P Male,9Pins "D"Sub ConnectToMatrix XCP-ADAM-MCJ2or ConnectToICP-2000
DE-9-P Male,9Pins "D"Sub ConnectToRVON-C SerialConnection
J2
RS485+ 6 3 RS485+
RS485- 1 2 RS485-
GROUND 2 N/C GROUND
DE-9-P Female,9Pins "D"Sub Zeus J1-J24
DE-9-P Female,9Pins "D"Sub ConnectToRVON-I/O O/I#1
Audio Output 8 4 Audio Input
Audio Output 7 5 Audio Input
Audio Input 4 7 Audio Output
Audio Input 5 8 Audio Output

Figure 11: Cronus Trunking Via RVON-I/O To RVON-8

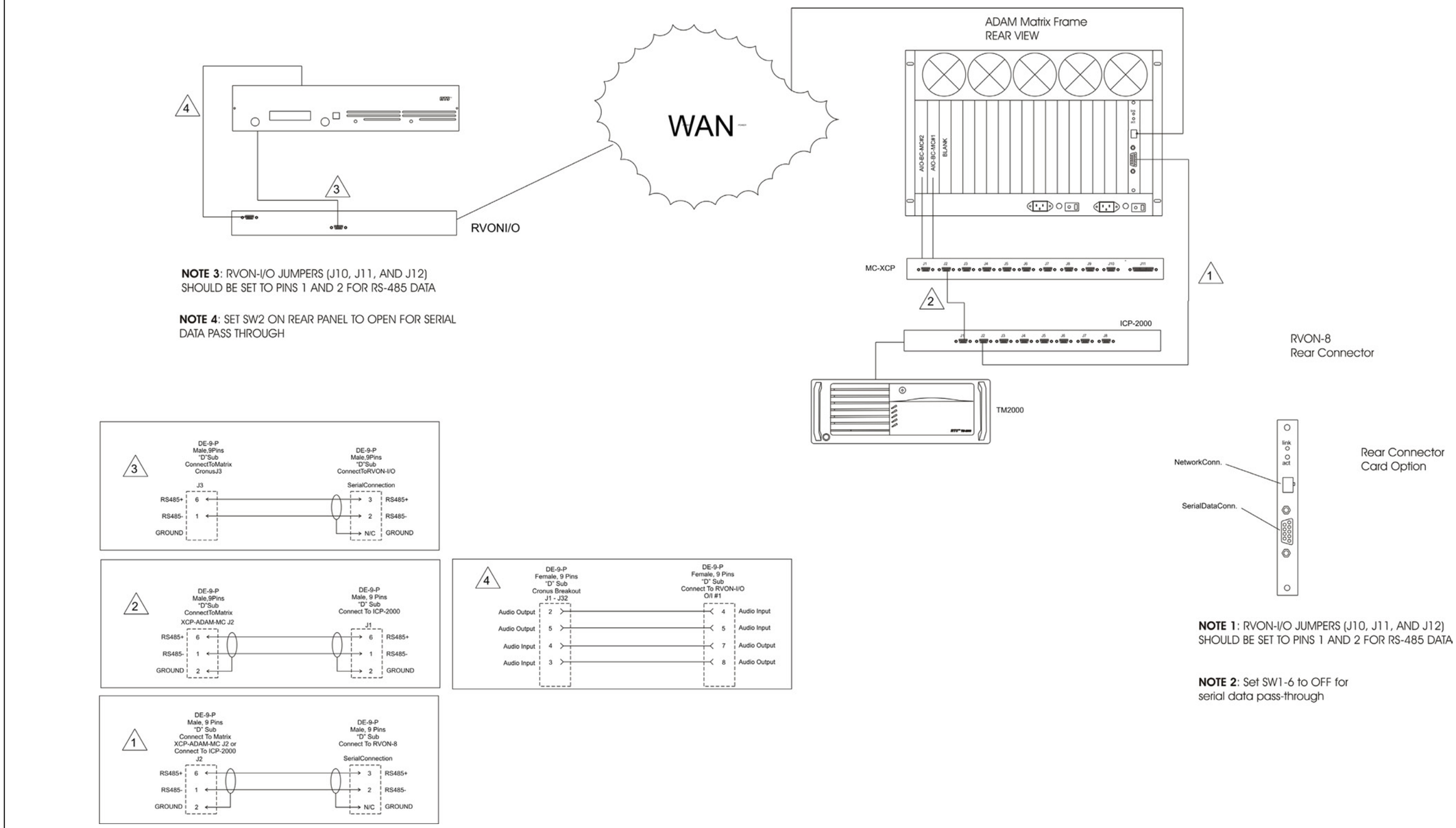
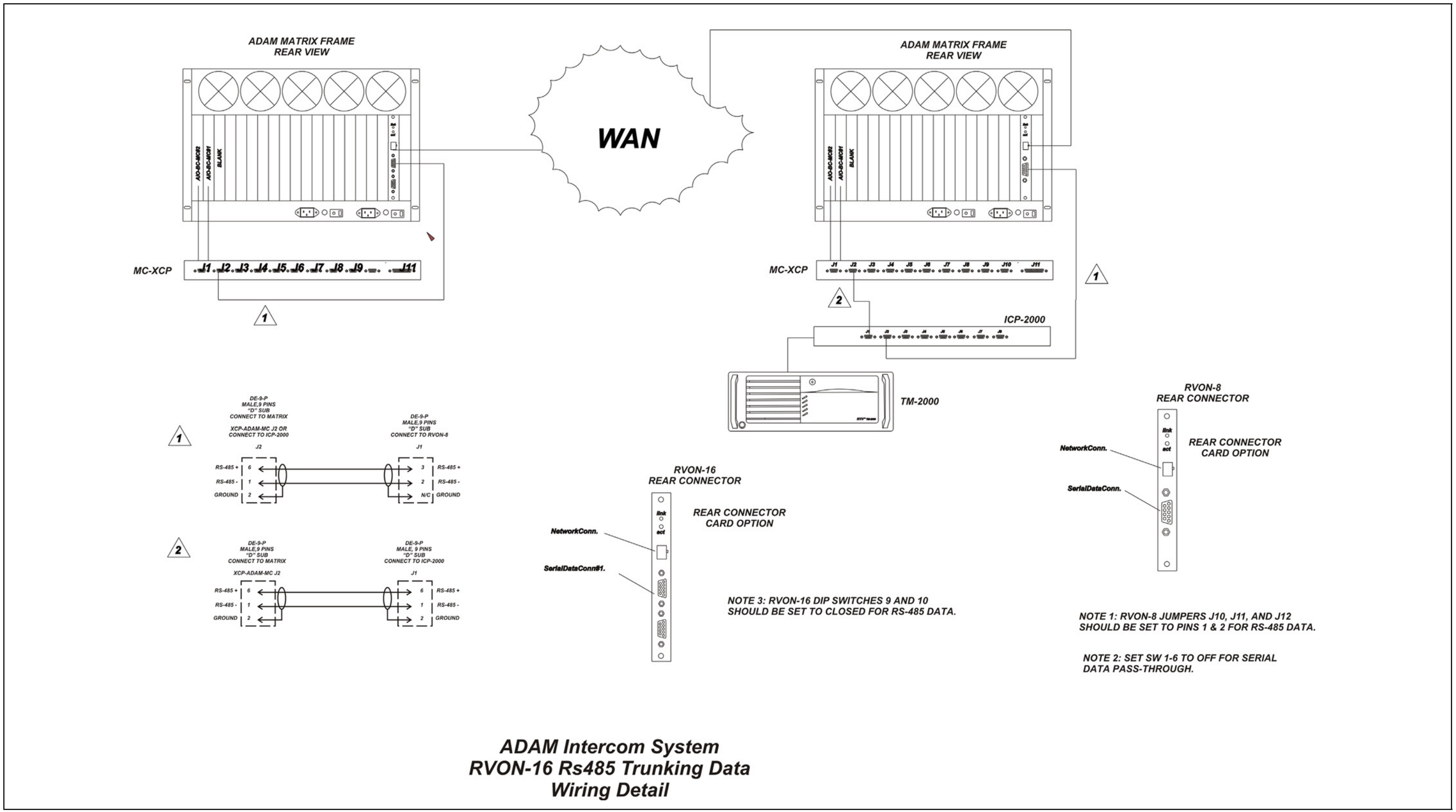

ADAM Matrix Frame
REAR VIEW
WAN
RVONI/O
MC-XCP
ICP-2000
TM2000
RVON-8
Rear Connector
NOTE 3: RVON-I/O JUMPERS (J10, J11, AND J12) SHOULD BE SET TO PINS 1 AND 2 FOR RS-485 DATA
NOTE 4: SET SW2 ON REAR PANEL TO OPEN FOR SERIAL DATA PASS THROUGH
DE-9-P Male,9Pins "D"Sub ConnectToMatrix CronusJ3
DE-9-P Male,9Pins "D"Sub ConnectToRVON-I/O
SerialConnection
RS485+
RS485-
GROUND
N/C
DE-9-P Male,9Pins "D"Sub ConnectToMatrix XCP-ADAM-MC J2
DE-9-P Male, 9 Pins "D" Sub Connect To ICP-2000
DE-9-P Male, 9 Pins "D" Sub Connect To Matrix XCP-ADAM-MC J2 or Connect To ICP-2000
DE-9-P Male, 9 Pins "D" Sub Connect To RVON-8
DE-9-P Female, 9 Pins "D" Sub Cronus Breakout J1 - J32
DE-9-P Female, 9 Pins "D" Sub Connect To RVON-I/O O/I #1
Audio Output
Audio Input
link
act
NetworkConn.
SerialDataConn.
Rear Connector Card Option
NOTE 1: RVON-I/O JUMPERS (J10, J11, AND J12) SHOULD BE SET TO PINS 1 AND 2 FOR RS-485 DATA
NOTE 2: Set SW1-6 to OFF for serial data pass-through

Figure 12: RVON-16 Trunking



Notes